NETWORK WORLD

The Newsweekly of User Networking Strategies

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Texaco opts for bridges over routers

By Susan Breidenbach
West Coast Bureau Chief

HOUSTON — Users are finding traditional routers lacking as they examine ways to link an ever broader mix of systems and protocols in wide-area networks.

One case in point is Texaco, Inc.'s Exploration and Production Technology Division (EPTD), which uses a wide-area network to link multiple Ethernets at five remote facilities — four in the Houston area and one in New Orleans. The network supports Digital Equipment Corp.'s DECnet and Local Area Transport (LAT) protocols as well as the Transmission Control Protocol/Internet Protocol.

Despite the heavy DEC orientation of the wide-area network, EPTD two years ago decided to replace its DECnet routers with 3Com Corp.'s just-released Internetwork Bridge/3 (IB/3).

"The DECnet routers just weren't cutting it," said data communications coordinator Chris Lonvick, a nine-year veteran of the Texaco division that built the wide-area net.

The routers could only handle DECnet traffic, which meant that users supported by TCP/IP and DEC's LAT terminal protocol — responsible for about half the network activity at the five sites

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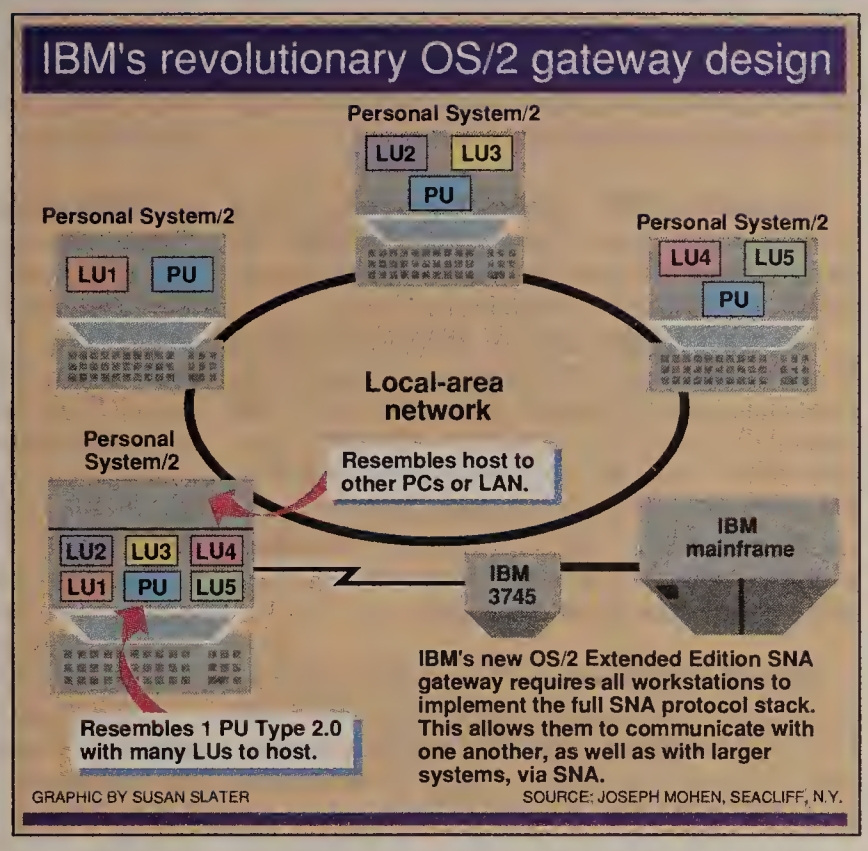

IBM's OS/2 EE gateway extends SNA into LANs

New design brings full SNA stack to PS/2s.

By Joseph Mohen
Special to Network World

Ever since it was first announced, IBM's OS/2 Extended Edition has been criticized for its lack of support for gateway functions.

Users with multiple Personal System/2s configured in a token-ring network often want to share a single telephone line to access a Systems Network Architecture host. But the inability of OS/2 workstations to share a single synchronous link to other network resources was seen as a serious shortcoming that raised questions about how widely OS/2 Extended Edition would be accepted.

Recently, IBM has aggressively responded to this criticism. It has not only announced an SNA gateway with an unorthodox design for Release 1.2 of Extended Edition, but it has also provided a glimpse of what the ultimate SNA gateway of the future will look like.

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IBM offers peek at SNA expert system

Virtual Route Analyzer isolates disturbances on voice/data nets and offers corrective measures.

By Wayne Eckerson
Staff Writer

BOULDER, Colo. — IBM last week demonstrated a personal computer-based expert system that identifies problems in Systems Network Architecture backbones and recommends remedial action.

John Waclawsky, a senior developer in IBM's National Service Division in Gaithersburg, Md., demonstrated the Virtual Route Analyzer (VRA) to network managers attending the International Communications Association's Summer Program here.

IBM engineers currently use the expert system to pinpoint evasive SNA performance problems, such as lagging response times and application processing delays, for customers of its Network Support service. The service, announced last fall, lets customers give IBM full responsibility for running and maintaining their voice and data networks.

Although only used as an engineering tool today, VRA may eventually be available commercially, Waclawsky said.

Doug Fagg, director of network support for IBM's National Service Division in Franklin Lakes, N.J., said VRA would need to undergo further testing and field use before IBM would consider marketing the system.

Waclawsky, however, is enthusiastic. "This system puts the knowledge of SNA troubleshooting experts at the disposal of network operators with minimal training. And the system provides

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Era of OSI net control draws near

By Jim Brown
Senior Editor

CHICAGO — Prototype integrated net management systems based on draft Open Systems Interconnection standards could be available as early as the fall of 1990, said users and vendors at last week's Network Management Solutions '89 conference here.

Users at the event, sponsored by *Network World* and the OSI/Network Management Forum, said OSI-based network management systems will dramatically ease the task of managing multivendor networks. But while users are eager for products based on the OSI net management standards, they are not sure whether to invest in such products before the standards are finalized.

Even if they adopt an integrated net management system, users will still need to retain existing management systems customized

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NETLINE

NEWSPAPER

Service firms, government top spenders in ICA survey

By Gail Runnoe
Washington Correspondent

DALLAS — On average, network spending by the nation's largest companies continues to grow at a modest rate, but telecommunications expenditures are soaring in some industries, according to an International Communications Association (ICA) survey released last week.

The 1988 Telecommunications Expense Survey, an annual report that tracks network budgets, shows that telecom spending will increase by an average of about 5% this year compared to 1988. However, that figure varied widely by industry.

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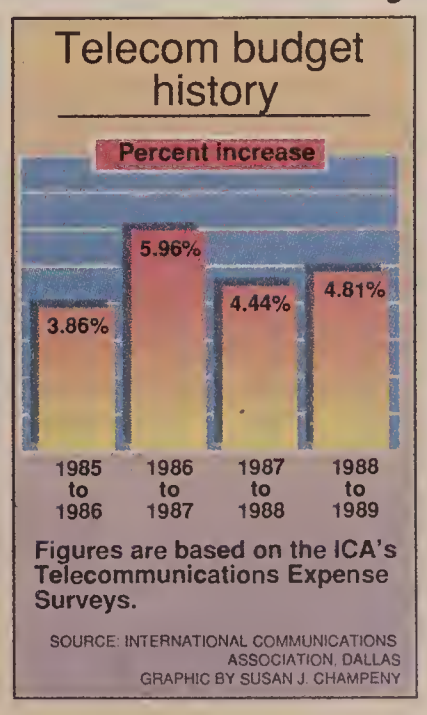

AT&T submits two more Tariff 12 custom net deals

Allied-Signal deal valued at $9.75m per year; unnamed user signs $60M per-year mega deal.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — AT&T broadened its battle for large corporate customers last week by filing new multimillion-dollar Tariff 12 arrangements for Allied-Signal, Inc. and another unnamed customer.

Robert Norian, director of corporate telecommunications at Allied-Signal, confirmed that AT&T filed a Tariff 12 network plan for the company, a $10 billion manufacturer of aerospace and automotive products based in Morristown, N.J. AT&T also filed another offer valued at $60 million annually, its largest Tariff 12 network deal to date.

AT&T did not name the customer in its filing and would not discuss either of the filings with the press.

American Express Co.'s Tariff 12 network, worth $45 million annually, is the next largest.

Opponents last week again vowed to protest the Tariff 12 plans, claiming the deals, and the six others filed previously, are unlawful.

Critics contend that Tariff 12 arrangements are nothing more than deep discounts offered to individual customers and that the deals unlawfully discriminate between users.

Earlier this year, the Federal Communications Commission rejected five initial Tariff 12 deals — for General Electric Co., Ford Motor Co., E.I du Pont de Nemours & Co., American Express and American Airlines, Inc. — because they contained geographic restrictions that prevented other customers from getting the same deals.

AT&T also filed a Tariff 12 deal for Federal Express Corp., but it has not yet taken effect ("AT&T files Tariff 12 custom net plan for Federal Express Corp.," *NW,* May 29).

Under the Allied-Signal network deal, worth $9.75 million annually for four years, AT&T will provide 1,356 voice ports and 146 data circuits, primarily at speeds of 9.6K bit/sec and below but also including six T-1 lines. Service will be provided in the U.S., Puerto Rico and the Virgin Islands.

Calls will be billed according to seven mileage bands and time of day. Examples of pricing for on-network calls during business hours are 6.3 cents per minute for a 200-mile call; 10.6 cents for

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Vendors unveil X.400 API to connect E-mail systems

Gateway-level API uses Message Transfer Agent.

By Sarah Vandershaf
West Coast Correspondent

SANTA CLARA, Calif. — A coalition of electronic mail vendors announced a common programming interface for X.400 here last week to facilitate the transfer of E-mail among systems from different vendors.

The X.400 Gateway Application Program Interface (API) was published by the X.400 Application Program Interface Association (APIA), a group formed last December by 21 vendors to develop a gateway-level API that would allow existing E-mail systems to exchange messages using the X.400 Message Transfer Agent.

When implemented, it will allow E-mail users to send messages to other users regardless of the equipment at either end, said Stephen Layne, cochairman of APIA and director of PC services for Telenet Communications Corp., a subsidiary of US Sprint Communications Co.

Vendors in APIA that developed the X.400 Gateway API standard include: Hewlett-Packard Co., AT&T, Digital Equipment Corp., Sun Microsystems, Inc., NCR Corp., Retix and 3Com Corp.

The X.400 Gateway API is a uniform set of function calls used to program gateway software residing on a file server to link E-mail systems, said Richard Miller, chairman of the Electronic Mail Association. E-mail vendors can use the specification to build interfaces to the systems of other E-mail providers, he said.

Standardization should reduce the cost of building E-mail systems and so reduce the price of those systems when they reach the market, Miller said. APIA is also working on a standard that would extend the specification to make it possible to use E-mail to transmit spreadsheets via X.400.

Although the push toward the X.400 Gateway API was instigated largely by the Aerospace Industries Association (AIA), other trade organizations, including the American Petroleum Institute, have shown interest in adopting the standard, said Steven York, chairman of the AIA's

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Briefs

Airlines halt net merger. American Airlines, Inc. and Delta Air Lines, Inc. last week scrapped plans to merge their reservation networks after the Department of Justice said it would file suit to block the proposed merger.

The Justice Department said the merger would violate antitrust laws and could result in higher fares and service problems for airline passengers.

The agency's decision left officials at both airlines baffled but unwilling to spend the time or money fighting a protracted legal battle.

Hardee's ISDN appetite. Hardee's Food Systems, Inc. of Rocky Mount, N.C., this week will begin testing ISDN Centrex service provided by Carolina Telephone and Telegraph Co.

The ISDN Centrex service will link Hardee's Rocky Mount headquarters with three remote locations and a nearby Hardee's restaurant, and it will support file-transfer applications. The ISDN Centrex service, delivered via a Northern Telecom, Inc. DMS-100, will gradually eliminate Hardee's dedicated data circuits and off-premises extensions, which are remote telephones hooked to the central office via special two-wire interfaces.

Enlisting ISDN help. The National Institute of Standards and Technology, the U.S. Air Force and AT&T will conduct an Open Systems Interconnection/ISDN trial this week at Mather Air Force Base in Sacramento, Calif.

The trial will demonstrate the use of OSI applications over an Integrated Services Digital Network transport network. It will involve the linkage of local- and wide-area networks via ISDN services.

AT&T said the trial may result in the inclusion of ISDN in the next version of the Government Open Systems Interconnection Profile.

In the trial, personal computers and workstations running OSI software are linked over ISDN Basic Rate Interface lines to the 5ESS central office switch. The 5ESS is tied to an AT&T System 85 private branch exchange over an ISDN Primary Rate Interface line.

Videoconferencing for the masses. Compression Laboratories, Inc. (CLI) tomorrow will announce agreements with AT&T, Hughes Network Systems, Inc., MCI Communications Corp. and Nynex Corp. to offer videoconferencing services to users on a month-by-month basis. Under the agreements, CLI, a San Jose, Calif-based videoconferencing system maker, will team with the vendors to provide users a single point of contact for installation and maintenance of the equipment and transmission links.

At a usage rate of just 20 hours a month, a complete system, including transmission facilities, will cost users less than $5,000 per month per site, said CLI Marketing Vice-President Kathryn Reavis.

CLI will supply video coder/decoders, devices that digitize and compress audio and video signals for transmission, packaged with its Gallery 2000 Videoconferencing Room System, which includes two monitors, a high-quality sound system, a graphics unit and a room controller.

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DEC PC LAN server doubles power, number of users

DEC will install, service Novell and 3Com wares.

By Laura DiDio
Senior Editor

NEW YORK — As expected, Digital Equipment Corp. last week introduced the PC LAN Server 3100, which has more than twice the power of DEC's current personal computer server and supports more than twice the number of users.

Also at PC Expo, DEC unveiled a comprehensive service and support program under which it will service, support and install personal computers and local networks from third parties. As part of the program, DEC struck agreements with Novell, Inc. and 3Com Corp. to install and support their local networks; however, DEC will not sell Novell and 3Com products.

Together, the announcements significantly broaden DEC's desktop strategy, analysts said.

"The performance of the 3100 shows DEC is getting serious about the PC LAN market, and that's good news for users," said Terry Shannon, manager of the DEC Advisory Service at International Data Corp., a research firm in Framingham, Mass.

DEC's decision to service and install other vendors' personal computers and local networks was inevitable, Shannon said. "DEC recognizes that there are other local nets installed at its sites and that it can derive millions in revenue from installing and servicing them. At the same time, the user gets the convenience of only having to call a single supplier," he said.

The PC LAN Server 3100, which is available now, is a MicroVAX 3000 processor packaged with server software. It replaces the PC LAN Server 2000, based on the MicroVAX 2000, which DEC unveiled last October. DEC said it will phase out this server over the next several months .

The PC LAN Server 3100 is positioned on a DECnet network as a file server for DOS-based microcomputers, Apple Computer, Inc. Macintoshes, and VAX/VMS systems. It provides those devices with access to files and peripherals, and serves as a router for electronic mail messages. The server currently does not support OS/2-based workstations.

> "The performance of the 3100 shows DEC is getting serious," Shannon said.
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The PC LAN Server 3100 supports a maximum of 32M bytes of memory compared with a maximum of 6M bytes of memory on the 2000. In addition, the new server supports 48 users, while a single PC LAN Server 2000 supported only 20 users.

The basic configuration of the PC LAN Server 3100 costs roughly 30% less than a basic setup for the PC LAN Server 2000. In addition, it offers 2½ times the power and a fivefold memory increase over its predecessor, said Gail Daniels, DEC's local-area network product manager.

PC LAN Server 3100 pricing starts at $12,500 for an entry-level configuration with 8M bytes of memory and 104M bytes of disk storage. A standard configuration with 8M bytes of memory and 312M bytes of disk storage costs $15,500, Daniels said.

Daniels said DEC is offering users four personal computer and local network service and installation packages: Start-Up Services, Direct Access Advisory Services, Maintenance Services and Desktop Integration Services.

Start-Up Services, available now, covers the installation of both DEC and non-DEC equipment. It does not cover installation of local nets. It costs $100 to $150 per installation.

Direct Access Advisory Services, available this fall, allows users to call into a DEC hotline from 8 a.m. to 8 p.m. to resolve problems or to get answers to software- or network-related issues. Pricing has not been set.

Maintenance Services covers on-site or carry-in repair of both DEC and non-DEC equipment. The service does not cover local net devices such as wiring, bridges, routers and gateways. Pricing varies depending upon the type and model of device.

Desktop Integration Services, also slated for fall availability, covers the installation of DEC, Novell and 3Com personal computer local nets. This service costs $100 per hour.

AT&T intros point-to-point Ku-band satellite service

Skynet Direct speeds go from 56K bit/sec to T-1.

By Tom Smith
New Products Editor

BASKING RIDGE, N.J. — AT&T last week introduced a point-to-point satellite network service, its first point-to-point offering in the Ku-band radio spectrum.

AT&T Skynet Direct Service will support voice, data and video signals between two locations at speeds ranging from 56K bit/sec to 1.544M bit/sec T-1 rates.

The company previously only offered point-to-point satellite services that used C band frequencies, but these frequencies interfere with terrestrial microwave signals and make it more difficult to locate earth stations, according to Frank Boschi, product marketing manager for Skynet satellite services.

Besides reducing concerns about interference, the Ku-band service is less subject to rain fade and contention.

"We are looking to use Skynet to augment customers' existing terrestrial networks and to provide disaster recovery capability," Boschi said. "There are critical applications for which customers need to step up quality or reliability, and that's where satellite comes in. It's also extremely cost-competitive."

Go anywhere

Boschi touted Skynet Direct as "a go-anywhere service" that will be attractive to customers because it can reach isolated locations that are off limits to conventional land lines. Users need a Federal Communications Commission license to operate the earth stations.

The antennas used with the service range in size from 1.8 meters to 3.6 meters, depending on the bandwidth needed.

A minimum bit error rate of $1x10^{-7}$ will be guaranteed for users, but Boschi said bit error rates could be as low as $1x10^{-9}$. Such dependability will be a key selling point, Boschi said.

Looking for more choices

"Customers are looking for alternative ways to either provide primary network capability, supplement things on the ground or protect themselves against catastrophic situations," Boschi said. "Satellite, from that aspect, has become more in demand. It has become a technology that has continually improved in its reliability. It doesn't fail very often."

AT&T expects the service to be generally available by the fourth quarter of this year.

Service pricing depends on the bandwidth used and the hardware configuration.

Users say vendors lag on integrated management

By Wayne Eckerson
Staff Writer

BOULDER, Colo. — Pressured by growing demands to improve network reliability, communications managers are increasingly frustrated by the absence of cost-effective integrated network management systems.

Network managers at last week's International Communications Association's (ICA) third annual Summer Program here said vendors aren't meeting their promises to deliver standards-based net management systems that are both simple to use and provide end-to-end supervision and control of corporate networks.

"Vendors are concerned about protecting their market share, and, as a result, they're stalling progress toward achieving integrated network management," said Phil Evans, director of telecommunications for Dallas-based FMC Corp. Evans assumes the post of ICA senior vice-president in July.

More than 130 ICA members and guests participated in the week-long ICA Summer Program, which focused on network design and management in multivendor environments. The program included lectures from vendors, users and consultants as well as hands-on lab sessions that enabled program participants to solve network management problems using equipment provided by vendors.

No easy answers

"Currently, there are no satisfactory solutions to network management," said E.W. Bender, second vice-president at The Travelers Corp. and cochairman of the ICA Summer Program. Bender said network managers gathered here to discuss industry trends and to get help in plotting network management strategies for the next five to 10 years.

While users said it's difficult to find immediate solutions to their network management problems, most had no problem describing the kind of systems they would like vendors to develop.

Most users said they want easy-to-use network management tools that can integrate the various systems they now use to monitor and manage their networks.

"What we need is an integrated network management system that doesn't require a doctorate degree in electrical engineering to run," said John Dupont, a consultant at John Hancock Financial Services Co. in Boston. "We have to get away from using 15 different consoles to manage each of our different networks."

Dupont said the multiplicity of network management systems makes it virtually impossible for a single person to understand how all of a company's systems interoperate. Valuable time is lost just tracking down the person who understands how a system works or can interpret its data, he said.

"The problem is not a lack of information, but information overload," he said.

Big difference

Network management systems need to do more than just monitor a network and pass alarms to other systems, said Gary Waldrep, a senior data communications analyst at Halliburton Co., a large oil drilling conglomerate based in Arlington, Texas.

Network management systems should provide performance statistics that enable users to determine whether, for example, they need to add another T-1 line to their network, Waldrep said.

Waldrep said net management systems should allow operators to issue commands to resolve problems once they are identified.

"There is a big difference between network monitoring and network management. Most vendors today are just passing alarms but not allowing users to do anything about them," he said.

Waldrep, however, believes AT&T's Accumaster Integrator, which is the crowning component of AT&T's Unified Network Management Architecture (UNMA), is a step in the right direction.

"[Integrator] ties all your network management systems together, including IBM's NetView, and lets you issue commands to resolve problems," he said.

Reluctant buyers

Unfortunately, Accumaster Integrator is not yet available, and for many users the entire UNMA package will not prove a cost-effective solution. Some attendees estimated that UNMA may cost as much as $500,000.

In the meantime, users are caught in a bind. They are reluctant to spend $100,000 on a network management system they need now when a better system could come along in the future, Waldrep said. "People are still waiting for a pie in the sky," he said.

Correction: In the June 12 Buyer's Guide on PC facsimile boards, the telephone number of SpectraFAX Corp. in Naples, Fla., was incorrect. The correct number is (813) 643-5060. Also, Dean Leas' name was misspelled. Leas is president of D&D Consulting in Colorado Springs.

KFC looks for improved service, profits with OS/2-based POS net

$24 million network will link 1,200 restaurants nationwide.

By Laura DiDio
Senior Editor

NEW YORK — Kentucky Fried Chicken Corp. (KFC) last week said it will build a vast OS/2-based point-of-sale network, linking 1,200 restaurants nationwide with mainframes at corporate headquarters.

The network, which will cost the company about $24 million, will help KFC improve customer service and profit by a healthy margin, said Monte Jones, KFC's vice-president of information resources, at last week's PC Expo here.

"The OS/2 network will allow us to deliver more food to our customers than the competition and still keep prices reasonable," Jones said.

Each fast food outlet will have its own mininetwork, with POS devices connected to NCR Corp. 386/SX-based personal computers positioned as nondedicated network servers in each manager's office.

These servers will run Microsoft Corp.'s OS/2 Standard Edition Version 1.1 operating system, as well as a proprietary communications program supplied by NCR that links the POS devices to the server.

The server will support local OS/2-based applications, such as real-time tracking of sales and inventory, and programs that will regulate and monitor cooking operations in what the company is calling "smart kitchens."

While the server handles store operations, communications software operating in background mode uploads sales and inventory data over a 24K bit/sec dial-up modem line to IBM 3090 mainframes at the company's Louisville, Ky., headquarters, where it is stored on disk.

The POS server also transmits the same data to a corporate IBM Token-Ring Network, so users at the headquarters can monitor daily cash deposits, gauge sales volumes — including how much of each item was sold — and identify trends regarding the success of sales promotions. Eventually, KFC hopes to eliminate the redundant transmission by attaching the mainframes to the Token-Ring.

KFC will link the 3090 mainframes onto the Token-Ring Net by outfitting a 3174 cluster controller with a Token-Ring interface card. That link will enable users on the local network to access sales and inventory data sent from the POS subnets and stored on the mainframe. The Token-Ring and the mainframe will communicate using IBM's Advanced Program-to-Program Communications protocol.

A network management system, running on a Token-Ring network at company headquarters, will monitor and control the remote POS nets.

KFC officials estimate that by using the POS networks, they can speed service by 30%.

The company expects to provide fresher food, for instance, because the POS net server will track freshness of all cooked food, notifying employees when it's time to discard it.

The network will also enable headquarters management to download pricing and sales promotion data overnight to the restaurants, Jones said. Currently, KFC mails memos to remote sites to update them on pricing and promotions and then managers must manually key in the pricing changes on POS devices.

Back at headquarters, the network management system will monitor activity on the POS subnets. The net control system consists of software provided by XcelleNet, Inc. of Atlanta. The software will run as an application under the OS/2 Extended Edition operating system, and it will receive data and transmit commands to and from the POS subnets via the IBM Communications Manager subsystem of OS/2 Extended Edition.

The net management software will run on two Intel Corp. 80386-based processors, one of which serves as a hot backup for the other in the event that the primary net control system fails.

The net control software is used to control the various hardware devices and software programs concurrently running on the subnets.

KFC chose OS/2 as the key technology for its POS setup because it offers multitasking and a friendly user interface, Jones said.

Besides the current network applications, KFC is working with NCR to develop new applications to run under OS/2 that will enhance food preparation to improve yields.

The user is also developing an application that will allow KFC restaurants to use the network to schedule the amount of hours employees will work in a given week, based on sales volume at individual restaurants, Jones said.

The net installation will be completed within the next 18 months.

Critics blast price caps for RBHCs

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Several leading users groups last week sharply criticized the Federal Communications Commission's plan to implement price cap regulation for the local exchange carriers, warning that ratepayers could be the losers if the agency proceeds.

Critics, including the International Communications Association (ICA), Tele-Communications Association, Inc. (TCA) and Ad Hoc Telecommunications Users Committee, warned that if the new regulatory scheme is implemented, service quality could decline and local carriers would have more flexibility to cross-subsidize services.

Specifically, the critics said price caps offer too much pricing flexibility to the local carriers and questioned whether the FCC would be able to monitor the carrier's performance under the plan. They said these concerns are particularly acute since the local carriers face little competition.

The Ad Hoc Telecommunications Users Committee blasted the plan, saying, "There is virtually nothing in the commission's proposal worth saving."

In March, after two years of controversy, the FCC voted to implement price cap regulation for AT&T beginning July 1 and to examine whether to apply price caps to the regional Bell holding companies. Price cap regulation places a ceiling on the prices that carriers can charge for services, rather than regulating profits.

FCC Chairman Dennis Patrick has projected that price cap regulation, if implemented for both long-distance and local carriers, would save ratepayers $1.6 billion in four years over what they would have paid under the current rate-of-return regulation. Implementing price caps only for AT&T would save consumers $900 million over four years, Patrick said.

The price cap plan proposed for the RBHCs would cover primarily interexchange access and operator services. Access charges from the RBHCs account for about half of the cost of a long-distance call. Intrastate services would continue to be governed by state regulators.

The FCC is proposing to divide local carriers' services into three

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US West to sell Northern Tel products in its region

Agreement said to bolster NTI's distribution and let RBHC offer a broader range of equipment.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — US West, Inc. said last week it will begin marketing Northern Telecom, Inc.'s Meridian private branch exchanges and Norstar digital key telephone systems within its 14-state territory.

The carrier also announced that it has acquired maintenance and service contracts for 365 existing Northern Telecom customers in the region for an undisclosed amount.

Jim Stever, president of US West Communications, Inc.'s business, government and education services division, said the agreement will enable US West to offer users a broader range of equipment.

The company already markets PBXs from NEC America, Inc. and InteCom, Inc., as well as key systems made by TIE/communications, Inc. and Eagle Telephonics, Inc. US West will continue to sell these products.

According to Greg Carlsted, director of telecommunications industry services at Dataquest, Inc., a San Jose, Calif.-based research firm, it's only a matter of time before sales of Northern Telecom products overtake sales of US West's other equipment offerings.

"Strategically, the agreement represents a key move for NTI," Carlsted said. While the agreement will broaden NTI's distribution reach, it will also give US West the benefits of selling a well-recognized range of products, he said.

Roger Moore, vice-president of marketing for Northern Telecom's Western region, said his company's products weren't selling as well in the West as in other areas of the country due to lack of a consistent sales channel.

"We were looking for a strong ally" in that part of the country to provide an avenue into the Western U.S. market, he said.

Nationally, Northern Telecom holds approximately 20% of the PBX market. In the West, Moore said, the company's share is only about 10%.

An optimal balance

Steve Kropper, a telecommunications analyst at International Data Corp. in Framingham, Mass., said the US West/Northern Telecom agreement exemplifies how Northern Telecom has "accurately gauged the trade-offs required to penetrate the RBHCs as distribution channels."

By restricting product distribution in US West's territory in return for the carrier's commitment to sell its line of products, he said, Northern Telecom has created an optimal balance between the manufacturer's desire for the broadest possible distribution and the seller's desire for limited competition.

US West's Stever says he expects Meridian and Norstar sales to take off quickly with the help of the 150 Northern Telecom employees' US West will take on board as part of the agreement.

Supercomputer network bill introduced in Senate

Net would link academic, industry, gov't users.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Hearings began in the Senate last week on a proposal to develop a high-speed national supercomputer net that would link government, industry and education users.

The National High-Performance Computer Technology Act of 1989, introduced last month by Sen. Albert Gore (D-Tenn.), calls for the government to invest $1.75 billion over the next five years to build a 3G bit/sec "information highway" and to encourage development of related technologies.

While the bill includes provisions for a number of items, including supercomputers, artificial intelligence and a national data base, last week's hearing before the Senate Commerce Committee focused on the section of the bill that would establish the National Research and Education Network (NREN).

According to Gore, NREN will enable researchers and others to use supercomputers and data banks throughout the country. This could help small and medium-sized businesses compete more effectively with larger companies that have access to powerful computers.

Gore's proposal calls for the National Science Foundation (NSF) to develop and manage the national network until commercial networks can meet the networking needs of researchers.

Gene Gabbard, chairman and chief executive officer of Telecom*USA, Inc., a long-distance carrier based in Atlanta, recommended that instead of charging NSF with the responsibility, a separate nonprofit corporation should be established.

The corporation could have a board of directors, he explained, half comprised of government and users group representatives and the other half comprised of members from industry groups supplying technologies and services for the project.

Under Gabbard's plan, the board would approve standards, select technologies, choose suppliers and disburse funds, while all nonmanagerial functions would be farmed out to government entities and industry.

This corporation would be chartered for five years, he proposed, and after a subsequent two-year wind-down period, would hand off network operation and control to a group of at least three commercial carriers.

(continued on page 66)

COS opens interoperability lab, shows off testing tools

MCLEAN, Va. — The Corporation for Open Systems (COS) introduced its new Interoperability Lab (I-Lab) to the public here last week and demonstrated testing between X.400 message-handling systems from eight vendors.

The lab is designed to enable vendors to run thorough and efficient interoperability tests and help speed the release of compatible products.

The lab can currently be used to test X.400 and File Transfer, Access and Management (FTAM) applications on 802.3 (Ethernet), 802.4 (token bus) and X.25 networks. COS hopes to later expand the facility to include an 802.5 token-ring network and testing for additional applications such as OSI's Virtual Terminal Protocol and electronic data interchange.

David Grieve, manager of the COS test center, said the I-Lab is distinct from the group's recently unveiled COS Mark program ("COS kicks off program to certify OSI conformance," *NW,* May 1, 1989). Although OSI conformance testing is a prerequisite to participation in the I-Lab project, vendors can pass a conformance test without receiving the COS Mark.

The COS Mark signifies a vendor's pledge to work with other COS Mark vendors to resolve interoperability problems that may arise at user sites, in addition to certifying conformance to Open Systems Interconnection specifications.

Grieve said that when I-Lab completes its pilot phase at the end of the year and becomes a permanent COS facility, the group will consider devising an interoperability reporting mechanism similar to the COS Mark program to designate products that have successfully undergone I-Lab testing.

> "Vendors are able to talk face-to-face and exchange information on a real-time basis."
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Companies participating in the pilot program included AT&T, Bull HN Information Systems, Inc., Control Data Corp., Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., Sun Microsystems, Inc. and Unisys Corp.

COS will schedule formal I-Lab testing sessions quarterly. Member companies can use the lab anytime.

Vendors working at the lab said it is the best place to conduct interoperability tests. To date, most vendors have relied on trade show demonstrations or in-house labs to test their equipment.

Robin Cohan, senior product manager of OSI networking at DG, said the I-Lab is superior to trade shows because it is a permanent facility available year-round.

DG tested an updated version of its DG/X.400 message-handling system here last week and will test its DG/FTAM file-transfer product next week.

David Dunn, AT&T's AT&T Mail product manager, said that, unlike testing at the company's home office, "Vendors are able to talk face-to-face here and exchange information on a real-time basis." AT&T tested its AT&T Mail Gateway X.400 electronic mail service and PMX/X.400 premises-based software.

Thomas King, program marketing manager for network computing development at HP, called the I-Lab a tremendously efficient way to test products. "We're able to hard-wire things together and talk to the other vendors with COS here as an arbitrator," he said.

King also said he believes the COS name lends more credibility to the tests than testing done by other means. HP tested its HP-UX OSI/X.400 E-mail product at the lab.

The Standards and Promotion Application Group (SPAG), based in Brussels, Belgium, was also present at the I-Lab demonstration. According to Vincent Bellis, an engineer with the SPAG development division, the European standards body is considering setting up an interoperability test center similar to I-Lab in Europe.

Worth Noting

"Half the U.S. telecommunications industry's resources have been told to sit quietly on the sidelines while others make technological beachheads on our shores."

Casimir Skrzypczak
Vice-president
of science and technology
Nynex Corp.
Speaking before a House
Telecommunications and
Finance Subcommittee
hearing on RBHC
manufacturing restrictions

People & Positions

Lester Alberthal Jr. last week was named chairman of the board at **Electronic Data Systems Corp. (EDS)**, a wholly owned subsidiary of General Motors Corp. Alberthal has been president and chief executive officer of EDS since 1986.

The EDS chairmanship had been vacant since 1986.

Richard Walliser last week was named vice-president and chief financial officer of **Touch Communications, Inc.**, a developer and supplier of Open Systems Interconnection software.

Walliser was most recently with Novell, Inc., where he was vice-president of finance and administration/general manager of operations for the hardware division.

David Fullarton was named president of the **Information Industry Association (IIA)**, effective today. He succeeds Paul Zurkowski, IIA's founding president.

Previously, Fullarton was president of Consulting Services Corp., a Md.-based consulting company. In 1987-88, he served as chief executive officer of the International Foundation of Employee Benefit Plans.

IIA is a trade association representing more than 750 information services firms.

Switch sales sag as IBM, Siemens negotiations lag

Users wait to buy Rolm PBXs until dust settles.

By Gail Runnoe
Washington Correspondent

ARMONK, N.Y. — As IBM and Siemens AG enter the seventh month of negotiations over the sale to Siemens of IBM's Rolm Systems Division, analysts say Rolm PBX sales are falling due to growing concern among users about the pending reorganization of the switchmaker.

Late last year, IBM announced plans to sell to Siemens the assets of its unprofitable Rolm Systems Division and to team up with the West German giant to market and service Rolm private branch exchanges ("IBM, Siemens carve up Rolm operations," *NW,* Dec. 19, 1988).

At the time, IBM officials predicted an agreement would be finalized early this year. But both companies now say hammering out the complex international partnership has taken more time than was originally anticipated.

Some analysts said the negotiations hit a snag over decisions about integrating the two companies' flagship PBXs — Siemens' Hicom, which supports ISDN applications, and IBM's 9750 Business Communications System.

A Siemens spokeswoman said a multitude of technical and legal details are involved in the negotiations, but that the agreement is "still something both companies want very much." A spokesman for IBM said a contract should be signed sometime this summer.

Sales erosion

While analysts remain confident that the agreement will eventually be consummated, they say uncertainty surrounding the deal has eroded Rolm sales significantly.

Shipments of Rolm products dropped 10% in the first quarter of 1989 compared to shipments during the comparable period last year, said Greg Carlsted, director of telecommunications industry services at Dataquest, Inc., a San Jose, Calif.-based market research firm. He expects this downward trend to continue until terms of a final agreement are announced.

Dataquest reported that Rolm held a 15.9% share of the U.S. PBX market in 1988, up from its 1987 share of 14.5%. "I suspect that 1988 will be the highest Rolm market share for a while," Carlsted predicted.

Many industry analysts say negotiations have been prolonged

(continued on page 64)

INDUSTRY BRIEFS

Mountain View, Calif.-based **Network General Corp.** said last week it expects earnings and revenue for the first quarter of fiscal 1990 to be 30% higher than earnings for the previous quarter. The company, which sells diagnostic products for local networks, expects to release official first-quarter results July 21.

The company's earnings for the fourth quarter of fiscal 1989 were $784,000, and revenue was $4.01 million. First-quarter earnings in fiscal 1989 were $576,000 on revenue of $2.58 million.

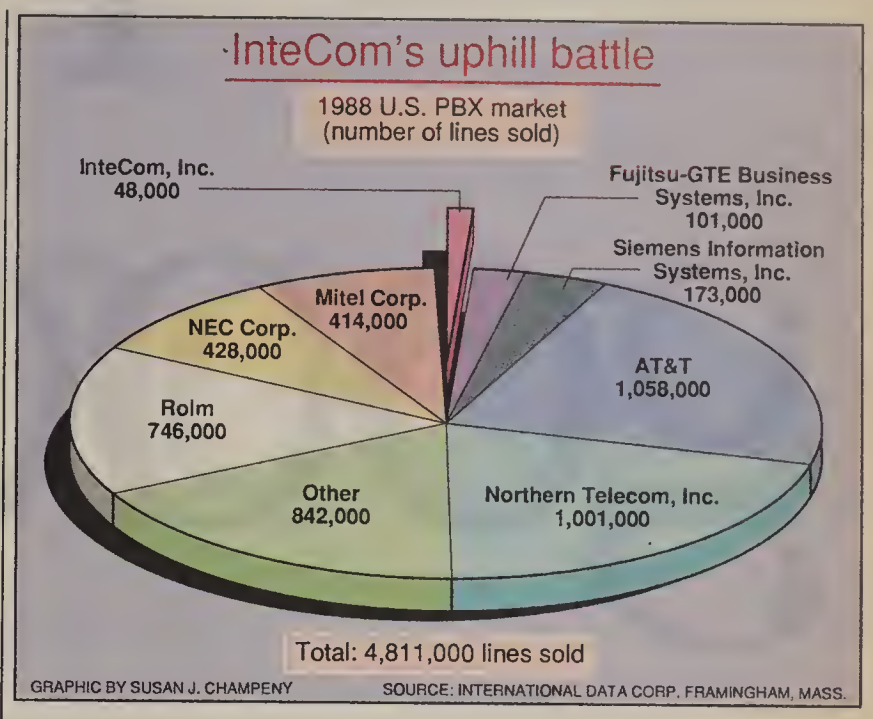
Network General said the growth in earnings is due to strong demand for its Sniffer product line.

GE Information Services (GEIS) and **Stet, S.p.A.**, the telecommunications and electronics arm of the giant Italian conglomerate IRI, last week entered into an agreement under which Stet will purchase a 40% stake in GEIS S.p.A. The company will be operated as a joint venture of Stet and GEIS to provide value-added network services in Italy.

The agreement calls for the establishment of a data processing center in Italy. Currently, international GEIS clients are served by data centers in The Netherlands and the U.S. Terms of the Stet/GEIS arrangement were not disclosed.

AT&T last week named Gordon Bridge and Richard McGinn to share the post of president for the company's recently reorganized Computer Systems business unit.

Both men will assume the title of president on July 1 and will share all aspects of the position, AT&T said. The Computer Systems unit is responsible for development, manufacturing, sales and service of networked computing products.



InteCom charts new strategy for future

Rumors that Wang may sell off PBX maker cast a shadow over new product, marketing efforts.

By Bob Brown
Senior Writer

ALLEN, Texas — Amid rumors that it is on the block, PBX-maker InteCom, Inc. says it is executing a three-year plan designed to capitalize on its ties with parent Wang Laboratories, Inc. and further its market reach.

InteCom's strategic plan focuses on improving its technology, which has been considered the company's strength since it began selling private branch exchanges in 1981, and its marketing, which is viewed as a weakness.

InteCom is promising to deliver a new low-end PBX in the fall, has scheduled field tests of its first major Integrated Services Digital Network products, and is working toward improved integration between its products and Wang's imaging and other wares.

On the marketing side, the company says it intends to focus its energies more on key vertical markets and on keeping its installed base intact.

Despite InteCom's optimism, industry observers said they expect financially troubled Wang, which has laid off hundreds of workers this year, to sell InteCom as soon as it finds a taker. Even though InteCom says it is having its best quarter ever and has launched an aggressive marketing campaign, analysts said it is probably too late for InteCom to gain a big presence in the PBX market or to make the company an attractive buy-out candidate.

On the block?

In the past few months, InteCom has been offered to several firms, including companies overseas, according to industry sources.

After reports surfaced in April that Wang would sell InteCom, Wang released a statement saying: "Wang has, since it purchased its initial interest in InteCom in 1984, continued to look for opportunities to maximize the value of InteCom by leveraging its assets and strengths in a manner that is in the best interests of Wang, InteCom and its employees and customers. Wang remains committed to InteCom and to achieving these objectives. Beyond this, Wang will not comment further."

Wang still will not discuss the matter, and InteCom will neither confirm nor deny whether it is on the block.

But with the resultant uncertainty surrounding the PBX maker, users in the market for a new switch will be cautious about buy-

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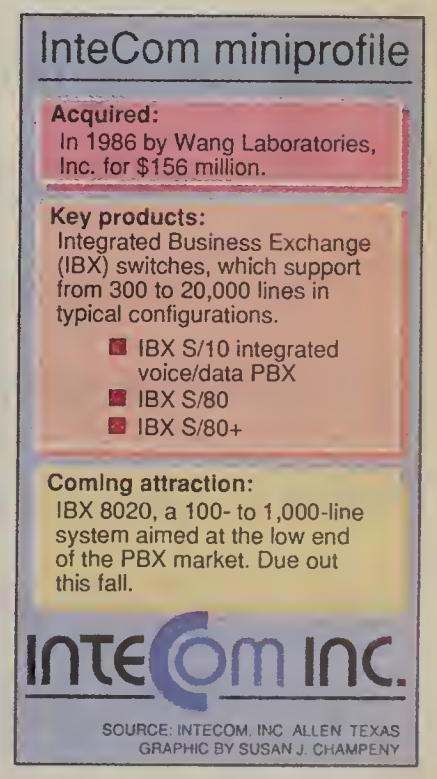

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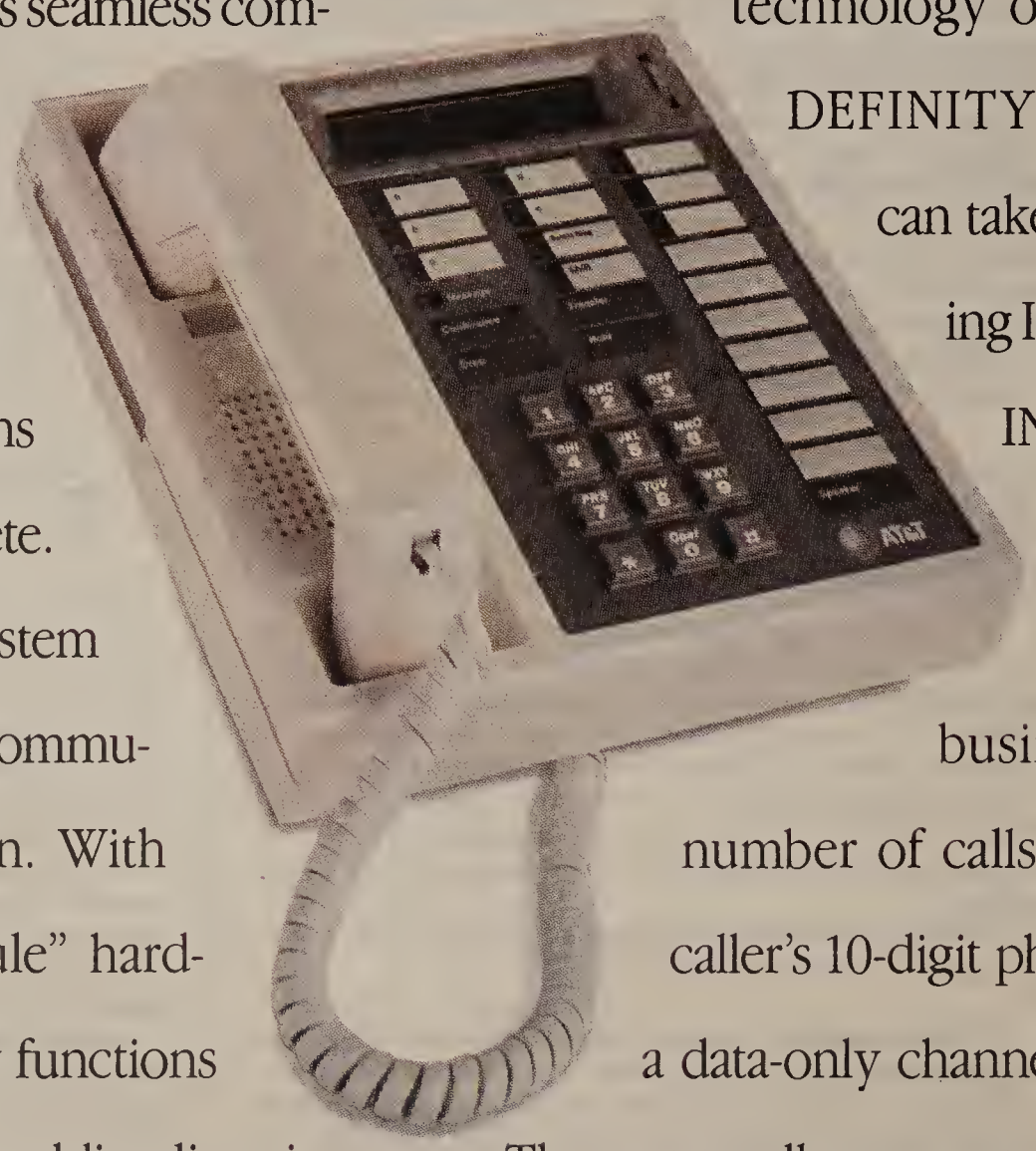

The communication system of the future is fully compatible with the telecommunication technology of the future. With a DEFINITY 75/85 system you can take advantage of emerging ISDN technologies like INformation FOrwarding-2. Especially helpful if your business handles a large number of calls, INFO-2 transmits a caller's 10-digit phone number through a data-only channel to your mainframe. The system allows you to retrieve, then display that caller's history on your screen as you pick up the phone.

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AT&T communications systems so popular. AUDIX voice mail, for example, offers you twenty-four-hour access for retrieving and leaving messages.

And AT&T's System Management offers you a range of tools, including windowing capabilities, to administer and maintain your DEFINITY 75/85 system.

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But even as functions such as AUDIX and INFO-2 are added, the DEFINITY 75/85 system's components and operations are standardized, and as simple as ever to operate.

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And if you're a current System 85 or System 75 customer, you can upgrade to the DEFINITY 75/85 system while protecting up to 90% of your installed communications investment.

The DEFINITY 75/85 system was designed to evolve as your business requires. With it there'll be virtually no limit on how large you can grow and still communicate effectively.

To find out more about the DEFINITY 75/85 system, contact your AT&T Account Executive, or call 1 800 247-1212, Ext. 190.

From equipment to networking, from computers to communications, AT&T is the right choice.

AT&T
The right choice.

InteCom charts new strategy

continued from page 7

ing from or staying with InteCom, industry watchers said.

"The uncertainty has to cause a lot of network decision-makers to have second thoughts about InteCom," said Vince Rafferty, a vice-president at The Aries Group/MPSG, a Rockville, Md.-based consulting firm.

But InteCom Marketing Director Arthur Franks disputes that, saying users have a positive view of InteCom.

"This is essentially a very positive period of time at InteCom," Franks said. The company, whose financials are consolidated with Wang's, said line and unit shipments have increased 20% compared to the similar period last year, in what is overall a flat market.

Focus on vertical markets

InteCom is hoping to become more effective in dealing with national accounts by aggressively targeting vertical markets most appropriate for its switches — namely users with campus-type environments such as universities, he said.

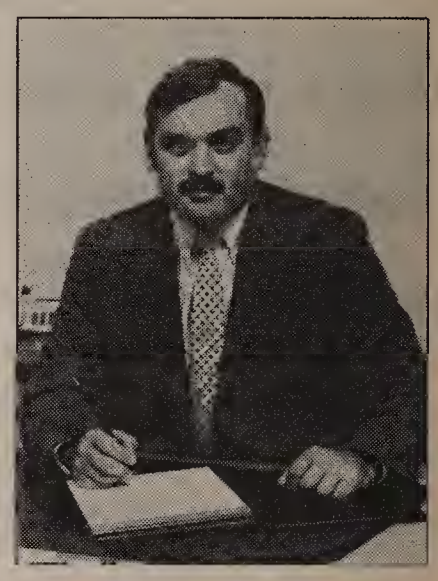
Among the coming attractions at InteCom: a new switch, dubbed the Integrated Branch Exchange (IBX) 8020, which is expected to be available in the fall. According to Franks, the switch is aimed at the 100- to 1,000-line PBX market and will complement InteCom's existing switches in a product line anchored by the IBX S/80, which can support up to 15,000 lines.

Currently, InteCom specializes in the high-end PBX market and has about a 10% share of the above-1,000-line market, analysts said. The IBX 8020, which can be used in remote sites or branch facilities, may help the company pick up ground in the low end of the market.

"We've had a wonderful experience with our customers at their 5,000-line headquarters, but they have a bunch of Mitels or Northern [Telecoms] out there in their branch offices," Franks said. "Those switches work together, but only on a plain-vanilla, E&M, tie-line basis. We'll now be able to give them the opportunity to migrate to private digital networks as a precursor to ISDN."

InteCom also plans to show users and the analyst community that the Wang-InteCom matchup makes sense, Franks said.

"We're trying to work together more closely, especially to take advantage of Wang's imaging technology," he said. For example, Wang recently announced that its imaging systems could operate over local networks based on Banyan Systems, Inc.'s VINES network operating system. Franks said users could link multiple local networks supporting imaging systems through the IBX.



InteCom's Arthur Franks

InteCom also plans to link its switches with a variety of Wang systems using Intecom's Open Application Interface, a computer-to-PBX link.

Long overdue

Analysts said InteCom's new aggressiveness in marketing is long overdue, as is its foray into the under-1,000-line PBX market. "Going after the high-end market is fine, but it's a small niche," Rafferty said. "InteCom's move into the low-end market is timed well because that market is going to open up again in the next 18 months to two years. There was dramatic growth in the low-end PBX market in the early '80s, and now most of those switches are coming to the end of their life cycles."

Despite promise in the low-end market, InteCom is not likely to attain substantial increases in profits or market share, analysts agreed.

There are several forces at work, they said. InteCom may no

(continued on page 12)

But not everything is free from obsolescence.

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With AT&T's special trade-in offer, we'll help you say hello to a DEFINITY 75/85™ system and goodbye to obsolescence. While we pay you to say goodbye, we'll also haul away your old system and help move your company's communication system into the future.

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InteCom charts new strategy

continued from page 10

longer be perceived as a technical leader — it was the first company to introduce an integrated voice/data PBX — according to Ian Angus, president of Angus TeleManagement Group, Inc. in Toronto. "In 1979, its switch was state of the art, but in 1989 it's just another switch."

InteCom is also limited by the size of its installed base — between 250 and 300 units — compared to the thousands of switches installed by other vendors, analysts said. "A lot of the money made in this business today comes from selling add-on features like voice mail and [automated call distribution], so it makes a big difference if you've got a large installed base," said Barry Gilbert, a principal with The Market Information Center, Inc., a consulting firm in Marlborough, Mass.

The larger players also have an advantage over InteCom in their ability to fund research and development, and to operate in an increasingly global market, said Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants, a Needham, Mass.-based unit of Computer Task Group.

"It's becoming more difficult to play in the PBX market in light of the formation of teams of global players such as AT&T-Italtel and IBM-Siemens," he said. "InteCom will be hard-pressed to fund R&D in the '90s. The time is past when a company with 1% or 2% of the market can be viable in the PBX business."

Intecom users plot new course

EL SEGUNDO, Calif. — Satisfied with the technical improvements InteCom, Inc. has made to its switches in past years, the IBX Users Group Association has turned its attention to fostering better communications with the PBX vendor.

Janey Place, manager of telecommunications at the Electro-optical and Data Systems Group of Hughes Aircraft Co. here and president of the users group, said the association's mission in past years was to work with InteCom to make the Integrated Branch Exchange (IBX) more reliable

Hughes Aircraft's Place

and productive. But now the group is concentrating more of its energy on improving the day-to-day dealings its members have with InteCom. The IBX Users Group represents approximately 110 users of the IBX.

"InteCom is not an easy company to do business with," Place said. "I think it comes from InteCom not only being entrepreneurial, but really an engineering company. So there are a lot of areas, such as maintenance and pricing, where we as a users group feel InteCom needs to make some improvements."

At its most recent meeting in May, the users group gave InteCom some input on how the company could work better with its installed base, Place said.

Place's division uses both an IBX S/80 and IBX S/80+, which are tied together via a fiber link. Because many of the division's net users are engineers and programmers (the IBX S/80+ supports some 10,000 users, most with voice and data needs), the data switching capabilities of the IBX switches are pushed to the limit to provide access to multiple computers, Place said.

— Bob Brown

Worth Noting

The U.S. has more than 118 million telephones nationwide, giving it a comfortable lead as the nation with the most telephones installed, according to AT&T. Lagging far behind in second place is the Soviet Union with about 27 million telephones.

Carrier Watch

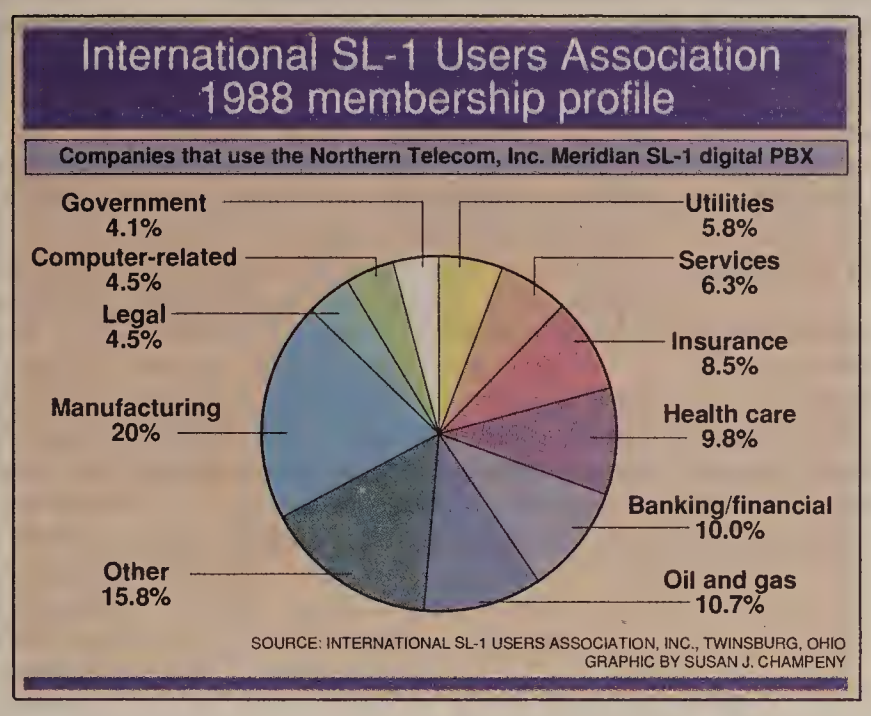
AT&T recently cleared the last major legal hurdle to offer its Federal Telecommunications System (FTS) 2000 service to the government when the U.S. Court of Appeals for the District of Columbia Circuit dismissed a suit filed by MCI Communications Corp.

MCI was a member of the losing bidding team headed by Martin Marietta Corp. After the FTS 2000 contract was awarded to AT&T and US Sprint Communications Co., MCI protested, alleging that AT&T had failed to meet the contract requirements.

The General Services Administration Board of Contract Appeals dismissed the case. The federal appeals court upheld that decision last week.

Southwestern Bell Telephone Co. announced last week that its SourceLine information gateway service trial has attracted 10,000 customers in its first two months. The service enables computer users to access more than 150 information services through a single telephone number.

Jack Goeken, the former chief executive officer of Airfone, Inc. and founder of that company before its acquisition by **GTE Corp.**, has won court approval to form a new company to offer airplane telephone services that will compete with Airfone. The company, In-Flight Phone Corp., will be headquartered in Oak Brook, Ill. Goeken, a telecommunications legend, founded MCI Corp.



Nynex details its plans for speech recognition systems

Some 300 technologies discussed at show.

By Barton Crockett
Senior Editor

BOSTON — Nynex Corp. used the recent International Conference on Communications here to demonstrate speech recognition capabilities it plans to deploy in its network beginning later this summer.

The Nynex technology was one of 300 nascent technology papers presented to more than 2,000 scientists and engineers who attended the show. Other papers described how networks can be used to improve health care in rural areas and make hospitals more efficient.

The show was sponsored by the Communications Society of the Institute of Electrical and Electronics Engineers.

Replacing operators

The speech recognition software that Nynex plans to deploy will initially be used to replace operator assistance on certain calls to Maine, New Hampshire and Vermont, according to Edmond Thomas, Nynex's corporate director of advanced technology development.

Today, calls made to disconnected or changed telephone numbers in areas served by electromechanical switches must be intercepted by an operator, Thomas said. The operator then informs the caller of the changes.

With speech recognition, calls made to these numbers will be intercepted, and the system will ask the caller to speak the number they dialed, one digit at a time. Push-button telephone users will simply redial the number.

The speech recognition system has a limited vocabulary, basically consisting of the digits 0 through 9 plus a few simple words such as yes and no. The software will translate the spoken words into numbers that can be used to query Nynex's customer data bases. Callers will then be informed of changes through prerecorded messages.

A comfortable level

According to Thomas, speech recognition software has only recently advanced to the level where Nynex feels comfortable deploying it in its network. "You know we have to really feel confident with this thing if we're using it in our net like this," he said.

Initially, Nynex will use speech recognition products purchased from a vendor Thomas declined to name. Eventually, Nynex plans to use customized speech recognition software it is developing in its White Plains, N.Y., research laboratories.

> "You know we really feel confident with this thing if we're using it in our net like this."
>
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Thomas said speech recognition capabilities will soon work their way into a whole host of new network applications. Next in line is an application designed to make it easier to set up conference calls and forward calls.

Rather than punching in a complicated series of numbers to set up a conference call or forward a call, residential users or subscribers to the company's Intellipath Centrex service will be

(continued on page 14)

BOCs price Centrex to attract customers

Carriers use a mix of service enhancements, flexible deals and innovative rates to lure in users.

By Bob Wallace
Senior Editor

In an aggressive drive to increase Centrex sales, many of the Bell operating companies are offering service enhancements, flexible contract terms and off-tariff pricing.

The strategy to lure customers back to the private branch exchange alternative appears to be working.

Pacific Bell, for example, has turned Centrex sales around. "We weren't listening to our customers a few years ago," said Richard Nielsen, Centrex program manager for the BOC. "But we've changed all that. We've enhanced Centrex in a number of ways."

Until last year, Pacific Bell only offered Centrex on a monthly basis. Now the company offers contracts that lock in rates for several years. It has also enticed customers by adding enhancements such as voice mail and support for electronic telephone sets.

These offerings helped Pacific Bell sell almost 500 Centrex systems in 1988, twice as many as the year before. "In 1987, we won 7% of all the requests for proposal we received," said Bob Lee, executive vice-president for marketing. Last year, the BOC increased its wins to 33%, including 36 of the 37 accounts it bid for in the large business market.

Other BOCs, including Illinois Bell Telephone Co. and Indiana Bell Telephone Co., are making heavy use of custom network pricing to stay cost-competitive with switch makers and distributors.

Staying in the game

Illinois Bell used custom pricing plans to migrate the state of Illinois, Motorola, Inc. and Sears, Roebuck and Co. to digital Centrex systems. Ted Edwards, business marketing senior program manager for the BOC, said it would have been difficult to compete with PBX heavyweights without the plans.

"We couldn't be a player in

(continued on page 14)

WASHINGTON UPDATE

BY ANITA TAFF

Dataphone Digital Service promo in works.
AT&T last week filed a promotion with the Federal Communications Commission targeted at winning new customers for its Dataphone Digital Service.

For customers that subscribe to AT&T's 19.2K bit/sec Dataphone Digital Service before Oct. 3 and request installation by Dec. 31, the carrier will waive nonrecurring charges for the 56K bit/sec digital data local channels, 56K bit/sec secondary channel options and 19.2K bit/sec central office connections needed to access the service. AT&T began offering 19.2K bit/sec Dataphone Digital Service this year, but users have to access it through higher speed local links because most of the exchange carriers have yet to offer complementary digital data services. AT&T told the FCC it expects the promotion to generate $109,000 in revenue within one year. The promotion is scheduled to go into effect July 3.

AT&T also deferred the effective date for its revised Tariff 12 to July 2 after the FCC requested more time to study the issue.

The FCC rejected the initial five network deals under Tariff 12 because they contained geographic restrictions that limited the offers to one customer. AT&T is still providing service to the five customers — General Electric Co., Ford Motor Co., E.I. du Pont de Nemours & Co., American Airlines, Inc. and American Express Co. — until the revised Tariff 12 takes effect. AT&T has also filed three new Tariff 12 offers, none of which have taken effect.

Opponents claim Tariff 12 offers are unlawful, and they have asked the FCC to reconsider its decision allowing AT&T to refile revised offers. AT&T's competitors have also challenged the tariff in court.

Nynex details speech recognition plans

continued from page 13

able to perform the tasks using verbal commands.

The software Nynex is developing to support this feature will have a much broader vocabulary than the software used in the operator assistance application, Thomas said. Nynex plans to begin trials of the capability early next year.

Speech recognition applications

Nynex eventually plans to embed speech recognition capabilities into the software packages it sells to end users, Thomas said. Applications could include speech recognition software that automates telemarketing and call-handling centers.

Thomas said the carrier could even make a package that lets a user record inventories simply by speaking into a microcassette tape or a small transmitter. Inventory data could then be transferred directly from the tape or transmitter into a company's inventory management software. "The possibilities are really limitless with this," Thomas said. "Any good marketing person could think up a million applications."

Other papers presented at the show described ways in which networks can be used to improve rural health care.

One paper, written by researchers at Vortech Data, Inc. and the Health Sciences Center at Texas Tech University in Lubbock, outlined ways in which image processing technologies could be used to digitize X-rays and other medical films and transmit them from rural hospitals to urban centers staffed with specialists.

Transmitting brain waves

Researchers from the Memorial University of Newfoundland in St. John's described a network that institution has built that lets rural hospitals attach an electroencephalogram cap to a patient's head and transmit his brain waves in real time to a distant urban hospital, where sophisticated staff and equipment can analyze them.

Another paper, by researchers at the Bedford, Mass.-based Mitre Corp., outlined how hospitals can build local networks that completely eliminate the need for film in radiology departments.

BOCs price Centrex to attract customers

continued from page 13

this market with one offering and one price. We couldn't be competitive. Without [off-tariff pricing], we would probably have lost them all," Edwards said.

The city of Chicago found the price and long-term contract option to its liking when it awarded Illinois Bell a 10-year, $32.5 million contract for 14,300 lines of digital Centrex for 500 city government offices last February.

"Without the special tariff, I don't think Illinois Bell would have won the project. The competition was just too tough," said Doug Power, telecommunications manager for the city. AT&T proposed selling the city an on-premises 5ESS central office switch. GTE Corp. wanted the city to buy a new central office switch but install it in one of GTE's central offices.

The city of Chicago currently pays $15 a line for 8,000 analog Centrex lines. By locking in prices for a decade, it will pay roughly $9.90 a line for digital Centrex and get 30 to 40 calling features currently not available with analog Centrex.

As part of the project, Illinois Bell will install two Northern Telecom, Inc. DMS-100 central office switches in its switching centers and run fiber-optic links to seven remote switching units installed close to the city's facilities, Power said.

Although the switches will initially be dedicated to serving the city's needs, the carrier may eventually use the equipment to serve other customers, according to an Illinois Bell spokesman.

The custom option

Indiana Bell used custom pricing to land Centrex contracts with pharmaceuticals giant Eli Lilly and Co. (5,200 lines), Indianapolis Power & Light Co. and, most recently, Northern Indiana Public Service Co. (1,200 lines).

The BOC landed business with Inland Steel Co., Indiana University and Northern Indiana Public Service by combining use of off-tariff pricing and remote switch modules.

The BOC installed a remote switch unit in Inland Steel's Harbor Works, Ind., facility to provide digital Centrex. Shortly thereafter, Indiana Bell installed a remote unit to help provide 18,000 lines of Centrex to some 250 buildings on Indiana University's campus.

In the case of Northern Indiana Public Service, the custom pricing and switch module helped Indiana Bell beat out bids from two PBX vendors, according to Mary Thompson, Integrated Information Network product manager for the BOC.

Other tactics

BOCs have used other means, including long-term fixed-rate service contracts to migrate users to Centrex. The state of New Hampshire, for example, recently moved from analog Centrex to 3,000 lines of New England Telephone and Telegraph Co.'s Intellipath II digital Centrex service to link 60 sites.

Pacific Bell used long-term fixed-rate contract terms to fend off vendors pitching PBXs to Great Western Bank, a Federal Savings Bank in Hollywood, Calif. The user awarded the BOC a contract for 2,800 lines of digital Centrex to serve 30 bank sites.

The state of California signed a five-year rate-stabilized contract with Pacific Bell that locked in pricing for its 90,000 Centrex lines as part of a $85 million deal.

DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

"We're interconnecting different networks so that routers, bridges and gateways are becoming the hottest boxes in town."

James Herman
Principal
Northeast Consulting Resources, Inc.
Boston

Data Packets

AT&T has added capability to provide two-way data communications for networks based in the Northeast through a shared earth station facility in New York.

The shared location serves as a network hub that gathers and relays transmissions to and from geographically dispersed very small aperture terminals. The new facility serves users of AT&T's Skynet Clearlink Network Service, a Ku-band offering for interactive data transmission and broadcast video.

The communications equipment and software used at the site is designed by Marietta, Ga.-based Tridom, a subsidiary of AT&T.

The New York hub is located in a 60-story AT&T network serving office equipped with an uninterruptible power supply and special fire protection systems.

Racal-Milgo recently announced an option for its Omnimux 8000 Series T-1 multiplexer line that enables it to support fractional T-1 services offered by AT&T's Accunet Spectrum of Digital Services. The option, which the company refers to as a fractional T-1 enhancement, consists of an interface board that plugs into the bus of the Series 8000 multiplexer.

The fractional T-1 support package can be used to upgrade Series 8000 units in the field. A field upgrade package costs $2,600. Customers can also configure new Series 8000 orders with the fractional T-1 support for $2,800.

IBM prepping DDM for SAA file access

One year later, AS/400 is only SAA processor compatible with Distributed Data Management.

By Paul Desmond
Senior Writer

A year ago last week, IBM repositioned its Distributed Data Management (DDM) file management software as a key component of its Systems Application Architecture (SAA) and committed to implement DDM on processors under the SAA umbrella within two years.

Today, just past the halfway mark, IBM's Application System/400 minicomputer line is the only SAA-compatible processor family to fully support DDM, but portions of DDM are available for System/370 mainframes under MVS and on a few non-SAA processors, including the Personal Computer and System/3X minicomputers.

DDM is one of the technologies that will provide uniformity among processors under SAA, said Gene Jurrens, corporate manager of distributed data architecture at IBM. SAA is IBM's plan to provide application portability among its System/370 mainframes, AS/400 minicomputers and Personal System/2 microcomputers running OS/2.

The DDM component of SAA promises to let users store files on any networked processor that can be accessed from applications on any other processors — a task not easily accomplished today because of differences in the file structures used by various machines.

Other benefits of DDM

The ability to access files anywhere on a network also promises to reduce storage requirements by eliminating the need for users to make copies of commonly used files, Jurrens said.

Furthermore, it simplifies the job of programmers who are developing applications that need to access data on remote processors, Jurrens said. Instead of building communications hooks into programs, programmers can write applications as if all data were stored locally. DDM takes over if the requested file is on a remote processor.

This is achieved by providing a generic set of commands for accessing and storing files. The command set removes the discrepancies among the file management systems used by the four

(continued on page 18)

NRI, MCI forge alliance for E-mail compatibility

By Gail Runnoe
Washington Correspondent

RESTON, Va. — The Corporation for National Research Initiatives (NRI) recently said it is conducting tests with MCI Communications Corp. to enable more than 400,000 users on the Internet network to share electronic mail with MCI Mail users.

As a result of the project, MCI Mail users will be able to send messages to mailboxes on the Internet, and Internet users will be able to access mailboxes on other networks, said Vincent Cerf, vice-president at NRI.

NRI will use Open Systems Interconnection X.400 protocols to build gateways between E-mail systems, but proprietary protocols will also be used where needed, Cerf said.

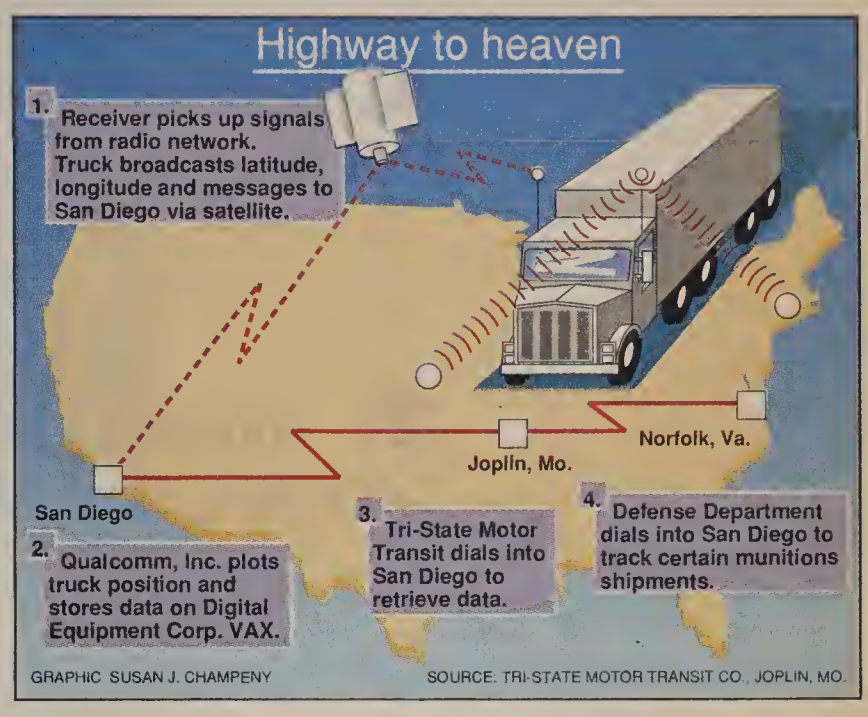
NRI is a nonprofit research and development firm supported by corporate sponsors including IBM, Digital Equipment Corp., Xerox Corp., MCI and others. According to Cerf, NRI's goal in this experiment is to identify and resolve the technical and operational issues involved with linking different E-mail systems used by individual organizations.

Internet is a nationwide research network that connects more than 6,000 science and education networks including the Department of Defense's Advanced Research Projects Agency Network (ARPANET), the National Science Foundation's (NSF) NSFnet and regional networks such as the New York State Education and Research Network.

Cerf explained that Internet uses its own E-mail specifications, called RFC-822, to format messages and then transmits them using Simple Mail Transport Protocol (SMTP), which typically is used in networks supporting Transmission Control Protocol/Internet Protocol.

NRI is trying to develop gateways to carry messages out of Internet and into systems using dif-

(continued on page 18)



Military munitions carrier installs tracking system

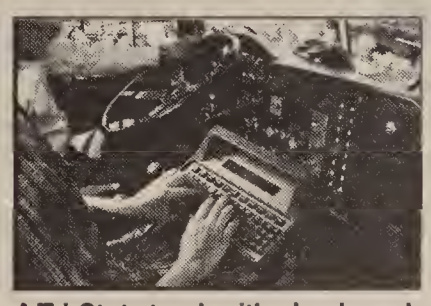
Satellite-based net locates trucks within a mile.

By Tom Smith
New Products Editor

JOPLIN, Mo. — Tri-State Motor Transit Co. recently began deploying a satellite-based truck tracking system that promises to maximize utilization of the company's 1,100 vehicles and their drivers.

The two-way satellite system also brings the military munitions carrier into compliance with the Department of Defense's Defense Transportation Tracking System (DTTS).

Compliance with DTTS eliminates the need for and cost of escort vehicles for trucks carrying Security Risk Code I munitions, which are portable missiles and rockets such as the Stinger. However, an armed escort with government security clearance is still needed on each truck.



A Tri-State truck with a keyboard.

DTTS, which became operational on a test basis in February, requires munitions carriers to provide hourly position reports and status messages, such as entering a carrier terminal or safe haven.

Tri-State installed an OmniTracs Mobile Satellite Communications System from Qualcomm, Inc. of San Diego. The system pinpoints trucks to within a mile of their actual location and gives the Department of Defense access to the coordinates, obviating the need for Tri-State to call in status updates.

The network also enables truckers to check on new assignments. "Tri-State gets over 6,000 phone calls per day, a lot from drivers requesting information or wanting to know what their next assignment will be," said Siamak Azmoudeh, manager of MIS at Tri-State. The system enables the company to inform drivers of their next assignments and keep them off the phone as much as possible.

The network represents a $4.4 million investment for Tri-State, which hauls general commodities as well as government materials and posted $105 million in revenue in 1988.

Each truck has a small device — made up of a keyboard and a 40-character, four-line display — which is attached to a receive-only loran-C radio antenna and a send/receive satellite antenna.

The truck's location is determined using the loran system, a public navigation system. The resultant data is then sent via satellite to Qualcomm's earth station in San Diego, where it is stored on a Digital Equipment Corp. VAX minicomputer.

Tri-State has two IBM Personal System/2s at its operations center here that automatically dial into Qualcomm every five minutes to download location information at 2,400 bit/sec, Azmoudeh said. The Department of Defense accesses this information in a similar fashion from Norfolk, Va.

Ten of the company's trucks have the radios today. Another 40 will be equipped within the next few months, and eventually the entire fleet will be outfitted, Azmoudeh said.

The keyboards in the trucks are equipped with a panic button so drivers can alert Tri-State and the Defense Department in the

(continued on page 64)

A Global Networking Scorecard:

1. Number of T-1/E-1 markets where vendor has PTT (International Phone Company) certification:

A	B	TIMEPLEX
		24(all)

2. Number of International networks currently operating on vendor's equipment:

A	B	TIMEPLEX
		300

3. Number of PTT's (International Phone Companies) utilizing vendor's equipment:

A	B	TIMEPLEX
		15

4. Number of nodes in vendor's largest currently operating single network:

A	B	TIMEPLEX
		160

5. Number of International Record Carriers using vendor's equipment:

A	B	TIMEPLEX
		ALL

6. Global 24 hours a day/7 days a week service is standard:

A	B	TIMEPLEX
		YES

7. Number of years in networking business:

A	B	TIMEPLEX
		20

8. Number of new customer accounts opened in 1988:

A	B	TIMEPLEX
		210

This scorecard is provided as an industry service by Timeplex, a Unisys company.

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IBM prepping DDM for SAA file access

continued from page 15

operating systems under the SAA umbrella. Those operating systems are MVS, VM, OS/400 and OS/2.

DDM includes both a server and requester function. The server function is implemented on processors where files are stored, and the requester is used by processors that need to access files.

A single processor can support both functions, but the only SAA processor that currently supports both is the AS/400. Otherwise, the server function is available under CICS with MVS/XA, and the requester is available for PC-DOS. Both server and requester are available for the System/36 and System/38, but they are not included in SAA.

Today, then, an AS/400 could request a file stored on a mainframe running CICS under MVS/XA, but the same mainframe could not request a file stored on an AS/400.

Flexibility to come

IBM intends to provide both the server and requester functions on each SAA processor by this time next year, according to Jurrens. That will give users flexibility in terms of where they can store files and allow them to take advantage of unused storage space.

Additionally, the large installed base of System/36, System/38 and IBM Personal Computer users will also be able to share files with any SAA processor.

Although DDM comes in different forms — it is embedded in the operating system of the AS/400 but is also available as a separately licensed software option for the System/36 — it performs the same functions on all hardware platforms.

Applications request data from files using high-level language file request commands. A local directory searches for the file and, if it is not found, is tempted to issue a "file not found" statement, Jurrens said. But a trap code within the processor's operating system sends the request to a supplemental side directory, which must be maintained by the systems administrator. Any file movements or name changes are entered in the side directory, according to Jurrens.

By searching the side directory, DDM finds the processor on which the desired file is stored and then routes the request over an LU 6.2 session to the remote host.

"All of this has happened without the application knowing anything," Jurrens said. "It may experience a brief delay in response time, but it sets up that end-to-end connection with the remote file and from there on proceeds just as if it were local processing."

Variables count

One potential DDM user that has a nationwide network of AS/400s has been conducting tests to find out how much of a delay the extra DDM traffic will cause under different conditions.

"There are variables you have to look at before you can put something like this into production mode," said James Stanley, network communications/systems specialist at Kendall Co., a manufacturer and vendor of health care products based in Boston.

Stanley said those variables include: response time targets; the number of AS/400s involved and their respective work loads; the time of day users will require DDM, taking into account time zone differences; and the extent to which DDM is likely to be used.

But DDM is expected to simplify such tasks as inventory inquiries, Stanley said. Today, if Kendall salespeople want to see if an item is in stock, they have to query one or more inventory files. If the file required is not on the local AS/400, they have to log on to whichever AS/400 has the file. That requires the salespeople to know which of Kendall's more than 25 AS/400s houses the file.

Another alternative is to initiate a request that will run through nightly batch processing and return an answer the next day, albeit with day-old inventory data.

"With DDM, you have the capability of making that request on-line in real time," Stanley said.

Kendall's test will also study how DDM can be used in financial and accounting applications to provide faster customer service.

NRI, MCI ally for E-mail compatibility

continued from page 15

ferent E-mail formats and protocols. Cerf expects that X.400 may in time come to replace SMTP because of its added functionality and broad public acceptance.

"All of the commercial carriers are building X.400 interfaces," Cerf said.

In addition to linking different electronic messaging systems, NRI plans to work on improving Internet's E-mail directory capabilities, enabling both MCI Mail and Internet users to search for specified names and mailbox addresses in all major Internet directories.

According to Cerf, once the interconnection technology is fully developed, it will be made available to other E-mail service providers. The experiment is scheduled to run until late 1990.

Cerf said he chose to work with MCI Mail on this experiment because he was familiar with MCI's mail system. Cerf helped design MCI Mail when he served as engineering vice-president at the company in the early 1980s.

While MCI has made its E-mail network available for the two-year experiment, interoperability research will be conducted by NRI scientists. MCI declined to comment on its role in the experiment.

LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

In a recent survey of 150 network managers conducted by New York-based investment banker Oppenheimer & Co., Inc., Novell, Inc.'s NetWare operating system was named by 64% of the respondents as the product most likely to be considered first for new local net purchases.

Netnotes

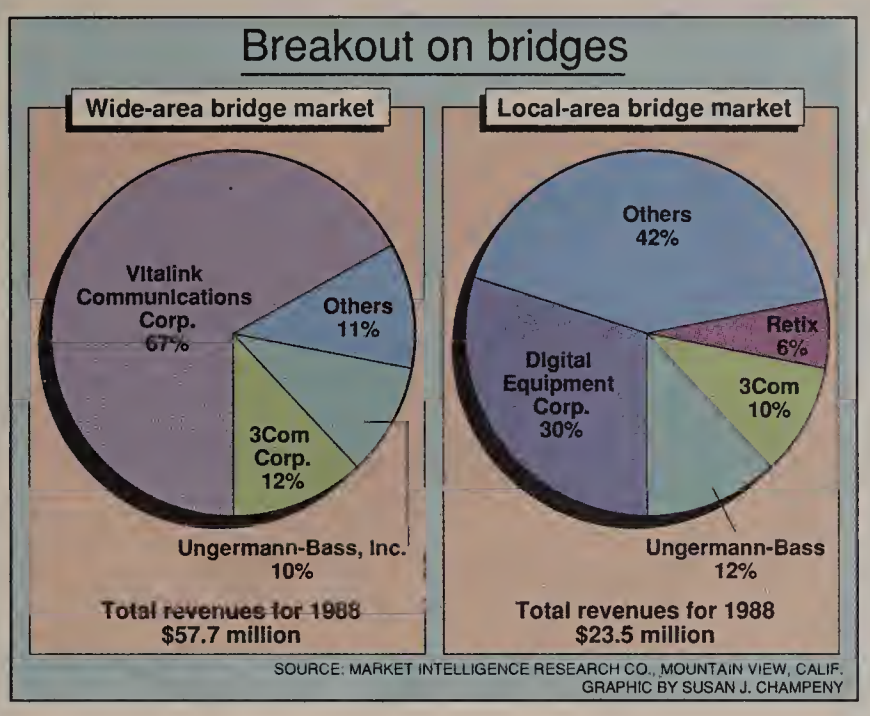
Ashton-Tate Corp. is taking its SQL Server, a local net data base server product, on the road for users to test the software and learn about the firm's plans to position the product in corporate nets.

SQL Server is a relational data base server for personal computer-based local networks that support Microsoft Corp.'s OS/2 LAN Manager network operating system.

ODC Systems will sponsor an SQL Server Forum Tuesday, June 27, at the Radisson Hotel in Arlington, Ill.; Connect Computer will bring the forum to the Hotel Sofitel in Minneapolis on Wednesday, June 28. The show will move to New York's Helmsley Park Lane Hotel on Thursday, June 29, where it will be sponsored by LANservices, Inc.

A new cabling filter from **Nevada Western** of Sunnyvale, Calif., connects Macintosh computers to a token-ring local network via unshielded twisted pair.

Available July 1, the MAC*LAN4 media filter attaches to a Macintosh II token-ring adapter using a nine-pin D-type connector. The wall plate can be up to 150 feet from a telephone closet patch panel, which is connected to an IBM Token-Ring Multi-Station Access Unit (MAU) or a Nevada Western MAU. The MAC*LAN4 kits, which include a media filter, the RJ-11 cable and an additional 10-ft. cable with an RJ-45 modular interface, are priced at $55.



Bucklin Int'l, Cross Info. offer Mac/PC E-mail pack

Cross+Point software uses MacNode technology.

By Susan Breidenbach
West Coast Bureau Chief

ZEPHYR COVE, Nev. — Bucklin International, Inc. recently entered into an agreement with Cross Information Co. to enable Apple Computer, Inc. Macintosh and DOS-based personal computers to share Cross' Cross+Point electronic mail and groupware software across local networks.

The Cross+Point software, which is installed on a server supporting Network Basic I/O System, includes E-mail, bulletin board, telephone messaging and personal scheduling modules.

Optional groupware conferencing, facsimile and internetworking modules are available separately.

Bucklin will link Macintoshes into the personal computer local network via MacNode, a diskless Intel Corp. 8088- or 80286-based computer that fits underneath the Macintosh and plugs into its LocalTalk port. The MacNode box is equipped with a standard Arcnet, Ethernet or token-ring interface that is, in turn, connected to the local-area network.

Groups of Macintoshes that need only occasional access to the network can use a MacNode/Gate option, which enables multiple Macintoshes to share and be daisy-chained to a single MacNode station.

In this configuration, the Macintosh users queue up for access to the network and then "own" the MacNode connection until they complete their network activity.

MacNode requires users to run a program, called MacShell, in the Macintosh. MacShell lets a user view a personal computer application, such as the Cross+Point software, in a window on the Macintosh.

Because the Macintosh processor is not directly processing the application, it is free to run Macintosh programs at the same time.

According to Linda Evans, president of Bucklin, MacShell supports multitasking under the Macintosh's MultiFinder, so the MacNode window is updated even when the DOS application is running in background mode.

Besides enabling Macintosh users to run any DOS application, MacNode can be used for file transfers between DOS and Macintosh applications that use compatible file formats.

With applications that do not use the same file format, Macintosh users can cut and paste any DOS file or screen to the Macintosh, Evans said.

> MacNode requires users to run a program, called MacShell, in the Macintosh.
>
> ▲▲▲

The MacNode stations are priced at $1,550 for the 8088-based unit and $2,195 for the 80286-based version. The MacNode/Gate costs an additional $495.

The basic Cross+Point software is priced at $395 per server. Options include a GroupWare Conferencing module for $195; a facsimile-to-E-mail interface for $195; and an internetworking module that supports multiple local networks for $395.

Users face plethora of upgrade issues

Growth factors, long-term impact on net should be considered before investing in new products.

By Laura DiDio
Senior Editor

FRAMINGHAM, Mass. — Users facing a major local network upgrade must have a good idea of how the network will grow, in distance as well as the number of future users, before committing to an upgrade plan, consultants and users said.

Users should look to preserve as much of the company's original investment as possible, according to Don Piscarcik, vice-president of business development at Allied Data Communications Group, Inc., a systems integrator in Atlanta. Allied Data oversees about 500 net upgrades a year.

Foremost on users' minds should be the compatibility and interoperability of various vendors' products with existing gear, Piscarcik added.

Foiled by the gateways

Last year, the Aluminum Co. of America, Inc.'s (ALCOA) Rigid Packaging Division in Alcoa, Tenn., realized that gateways from its Ethernet subnets to Unisys Corp. mainframes attached to the backbone could not adequately handle all of the company's file-transfer traffic, said Dean Goodman, network systems administrator at the plant.

ALCOA management decided to upgrade the nets and gateways to support the Transmission Control Protocol/Internet Protocol, which offers a File Transfer Protocol (FTP) application.

Previously, the network sup-

(continued on page 22)

HP licenses token-ring, settles lawsuit for Apollo

By Sarah Vandershaf
West Coast Correspondent

ROTTERDAM, Netherlands — Hewlett-Packard Co. recently signed a nonexclusive agreement to license token-ring technology from Willemijn Holding BV, based here.

HP, which has traditionally espoused Ethernet as its primary local network technology, entered into the license agreement so its newly acquired Apollo Computer Division could continue to market token-ring local networks.

HP also raised the possibility of marketing a token-ring backbone for its own local network line at some juncture.

"We haven't made that commitment yet," said Ed Muns, general manager of the Information Networks Division of HP. "But if you look several years out, it's highly likely that [token-ring] technology will become as widespread as Ethernet."

For the present, HP will continue to focus on Ethernet, and the Apollo Computer Division will stick to token ring, Muns said.

HP's Ethernet links workstations over thin coaxial cable or unshielded twisted-pair wire. The workstations can be linked to minicomputers via a backbone network of coaxial cable.

Apollo's token-ring network links workstations over shielded twisted-pair cable at speeds of 4M bit/sec and 12M bit/sec. In the future, Apollo plans to offer a 16M bit/sec version as well, a company spokesman said.

The technology licensing agreement is part of the settlement of a lawsuit that Willemijn Holding brought against Apollo Computer, Inc. in February 1988. The company claimed Apollo used token-ring technology without the permission of Willemijn Holding, which holds patents for it.

Apollo, which is now a division of HP's Workstation Group after HP bought it a month ago, agreed to a consent judgment, filed in Delaware Federal Court, under which HP will pay Willemijn Holding an undisclosed sum to settle all claims.

An HP spokesman said the award would represent a "substantial" amount to Willemijn, but it is not a significant sum as far as HP is concerned. Apollo's litigation with Willemijn Holding was taken into account when HP purchased Apollo, the spokesman said.

Willemijn Holding's director, Olof Soderblom, said the pace of companies licensing token-ring technology has increased over the past three months.

A spokesman for Willemijn estimated that about 40 companies now license the patent, compared with 35 three months ago.

...odex forges a link to NetView

...ontinued from page 1

...tem that bidirectional control.

Besides saving the cost of NetView/PC software and the IBM Personal System/2 microcomputers needed to support it, eliminating the need for NetView/PC reduces potential points of failure.

The Codex announcement is the second example in recent months of a third-party success...

...develop a NetView/PC... face."

Codex's Thibault a... edged that the develo... DualView took six ... about one year, but he ... strategy is in keeping ... dex's emphasis on integr... work management.

"We believe the way ...

nior product li... Central-site 2600s ca... multaneously pass net manage... data to Codex's net man... systems using ...

...such as changing a Cod... time-division multiplexer's al... cations of bandwidt... modem p...

Codex Unveils Dual Mode...

By Matt Kramer

Codex Corp. last week introduced new firmware that permits its 2600 Series leased-line modems to be managed concurrently by IBM's NetView and Codex's management system.

With the announcement, Codex became the first major vendor to allow its ...anaged by ...

...by NetView. DualView also i... options not provided by IBM's n... Codex officials said.

"The 2600 includes a time... multiplexer mode so you can r... traffic between two different ... ers, such as a [Digital Equipm... VAX or a Tandem [Computer... tolerant system] and an IBM ... same site," said Bob Ries, s... Codex in ...

nt

NetWeek®

The Newsweekly of ...

Fairchild Business Newspaper • Monday, May 15, 1989

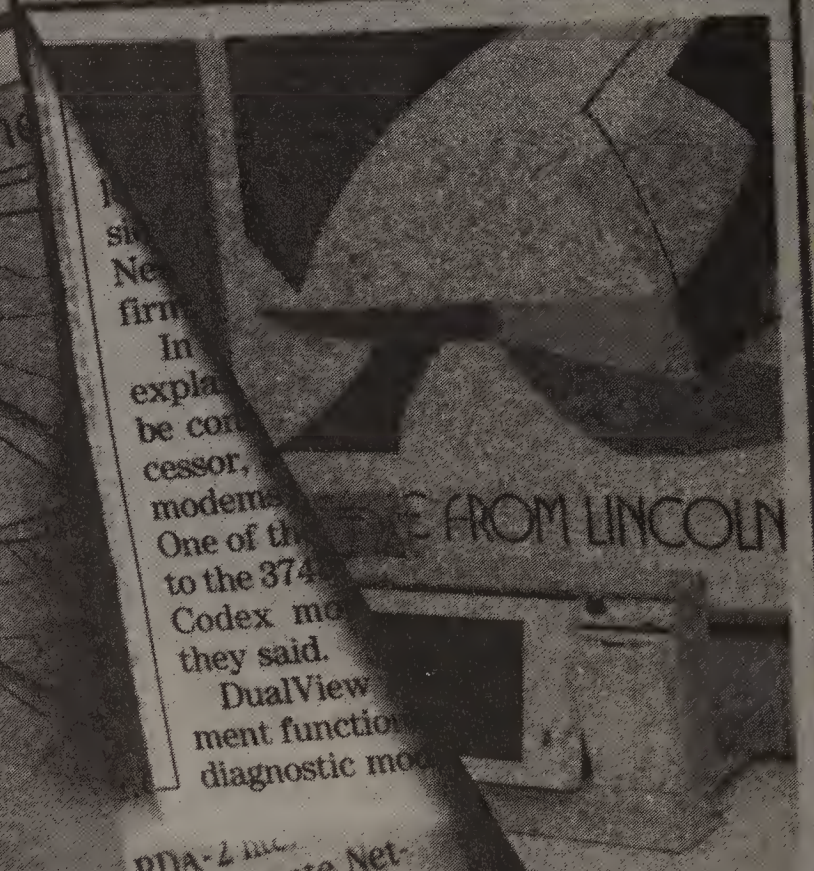
Volume 6, Number 19

Codex forges a direct link to NetView

By Paul Desmond
Staff Writer

CANTON, Mass. — Codex Corp. last week announced a product that will enable IBM NetView users to control Codex leased-line modems without using NetView/PC.

...an option for Co... ...leased-line ...



...PDA-2 ... can generate Net... ...e net manage... ...recognize queries ... ...ries, se...

IBM MAY REFA...

Code... IBM's...

By JEANNE IIDA

CANTON ... walls o... Busine... Corp.'s ... work manageme... breached last ... communications... Corp., as it intro... management sy... IBM's NetView ... er control over ... the remote port... works.

The Codex ... comes at a tim...

Just a few of Dual

THE BEST MODEM FOR NETVIEW ISN'T FROM IBM.

When we announced the new DualView Management Option for 2600 Series modems, it made big news.

And the biggest news is, for the first time you can choose a modem for NetView based on capability instead of compatibility.

So if you need a leased-line modem for NetView at speeds up to 19.2 kbps, now you can get it with DualView. Along with an integral time division multiplexer, fully automatic dial back-up, and other exclusive features.

DUALVIEW MAKES NETVIEW WORK BETTER.

DualView expands NetView's modem management capabilities with 10 unique built-in features unavailable on IBM modems.

Plus DualView totally bypasses NetView/PC, so you can monitor your modem network directly from NetView.

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Industry analysts said they expect
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Codex Modem Management Sys Gives NetView Users More Cont

CONTINUED FROM PAGE 1

which to now has been the only
's 7000 series of modems,
has been the only
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wide for U.S.-based vendors, according to I.D.C. figures.

Codex customers can upgrade their existing modems with the option.

"I don't know why nobody thought of this before," said eman, an analyst with firm The Yan-

IBM's modem mands, so modem stand and interpr work PDA comma

NetView only rea ta communications while the Codex system lets networ react before a prob when network condit ginning to degrade.

Codex customizes Netview link

BY ELISABETH HORWITT
CW STAFF

CANTON, Mass. — Codex Corp. introduced last week what may be the first direct link between a non-IBM leased-line modem and IBM's Netview.

Codex's Dualview Management Option uses IBM's own Link Problem Determination Aid 2 (LPDA2) protocols to allow Netview operators to monitor, reconfigure and collect alerts and alarms from the Codex 2600 series of high-speed leased-line modems, the vendor said.

However, the Codex product bypasses Netview/PC, IBM's recommended Netview route for third parties, thereby tackling the computer giant on its home ground in the heated high end of

N E W S

the modem market, said.

By providing its own with the same Netview ties that IBM modems enj dex hopes to eliminate ability to "gain account co via Netview," said Codex se product planner Robert Ries.

Customers for whom Ne view-based control is a prerequi site can now shop beyond IBM

ACE NETVIEW

x Bypasses NetView/PC

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vendors to write directly to NetView, instead of to the unpopular NetView/PC. IBM has repeatedly denied speculation that it will withdraw NetView/PC from the market.

Codex is offering a Dualview Management Option to its 2600 Series line of modems that will let network managers interactively manage leased line modems by NetView and by Codex's own Network Management Systems concurrently. The 2600 Series modems — with an installed base of about 10,000, according to Codex — will now compete head-to-head with

said that D
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rk management functions
BM's. Right now, Ries
customers don't have to
he Codex network man-
t system to use this op-
When we have more com-
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iew environment), cus-
ill need to have the Co-
m," Ries said.
ow, all NetView com-
nd Codex commands
be executed through
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ew) opens new chan-
and strengthens our
largest industry ven-
lems)," Ries added

tween
traffic. "A to
users on the MIS side
manage applications," said
Ries.

NetView customers can use Dualview to manage modems through NetView or they can manage modems through both NetView and Codex Network Management Systems.

MIS can manage applications layer traffic through NetView at the same time as communications managers manage through the Codex system.

"This is a genuine step toward genuine multi-vendor

su
NetView's
and Control Facility
offer more features
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Users face plethora of upgrade issues

continued from page 19

ported Xerox Corp.'s Xerox Network Systems, an older protocol that didn't have a particularly fast file-transfer utility.

In addition, the company tapped Ungermann-Bass, Inc. to install an Ethernet interface card into a Unisys DCP communications processor on the backbone, which serves as a front-end processor to the mainframes. The interface, which is based on TCP/IP, provides common protocol support on the subnets and the backbone net.

"After shopping around, we found that [Ungermann-Bass'] Net/One was the best price/performance solution to fit our needs," Goodman said. "It's a reliable network, and we still have 27 unused channels so we won't run out of capacity anytime soon."

For the University of California at San Diego (UCSD), the decision to upgrade from Novell, Inc.'s NetWare 286 network operating system to NetWare 386 was a simple one.

The university, which is serving as a beta site for NetWare 386 until it ships in September, realized its current local network setup could not sustain planned growth of the campus local nets.

UCSD's local network consists of a broadband backbone linking about 35 Ethernet subnets running NetWare 286. Within the next year, UCSD plans to add another 50 local networks with a combined total of about 1,000 IBM Personal Computer ATs and Personal System/2 Model 50s and 70s.

According to Gerry Shannon, manager of telecommunications at UCSD, NetWare 386 was the only alternative because it can support as many as 250 users on a single server and can handle the larger node loads that the university expects.

But Shannon still has some concerns about the pending upgrade. He said the success of the upgrade depends largely on third-party vendors, which must write NetWare 386 software drivers that will allow Novell Ethernet nets to interface to the broadband backbone.

Last year, the U.S. Navy decided to add 1,000 new personal computer users to its Ethernet networks.

But rather than expanding existing Ethernets based on unshielded twisted-pair wiring, the U.S. Naval Aviation Depot (NAVAVN) in Alameda, Calif., opted for Ungermann-Bass to supply a 4M bit/sec Net/One broadband backbone network to link the Ethernet subnets.

The Navy opted for the broadband approach for two reasons. First, it wanted a network that could handle a large number of nodes. With the addition of 1,000 nodes in the past year, Navy management decided the existing nets couldn't handle the strain. Second, the Navy wanted a secure network that was capable of sustaining data integrity in areas with high noise levels. Existing local nets based on unshielded twisted-pair wiring could not stand up to high levels of vibration and excess noise, the Navy determined.

"Our chief concern was finding a cost-effective media that could withstand interference and the vibrations on our naval base and, at the same time, allow us to easily interconnect our PCs with several different types of host systems," said Russell Sanderson, a civilian consultant and technician at NAVAVN.

In addition, the NAVAVN depot was installing several nets in airplane hangers, and the unshielded twisted-pair media couldn't withstand the shock and vibration of that environment, he said.

This year, the Navy plans to add almost 900 more nodes to its networks. And the broadband backbone is capable of handling that load.

According to Sanderson, the broadband coaxial cable backbone is capable of running data over 30 channels. Currently, the Navy only uses three channels.

Gandalf offers net concentrator for phone wire

WHEELING, Ill. — Gandalf Data, Inc. last week unveiled its StarPair system, a wiring concentrator for unshielded twisted-pair Ethernet networks.

StarPair enables users to run unshielded twisted-pair wiring from desktop computer devices to a network wiring closet, where the concentrator links the different leads onto a network backbone.

The concentrator also supports connection of devices running over coaxial cabling, fiber-optic cabling and thin-wire Ethernet.

Support of unshielded twisted-pair wiring gives users a less expensive wiring alternative to other forms of media, said Peter Curtin, StarPair product manager.

The system consists of two models: the MMAC-3, which supports connection of up to 27 Ethernet nodes, and the MMAC-8, which supports as many as 87 nodes.

StarPair can be used to link desktop devices over unshielded twisted-pair wire to the company's StarPort, a Novell, Inc. file server used to make network applications available to dumb terminals.

The concentrator can also serve to link local network nodes to StarMaster, a network processor that routes data over various wide-area transmission services.

StarPair is available now. Pricing varies depending on configuration; costs range from $550 to $700 per node.

Gandalf Data can be reached by writing to 1020 S. Noel Ave., Wheeling, Ill. 60090, or by calling (312) 541-6060.

Worth Noting

"ADCU has the talent to be a strong voice, especially on standards and public policy issues. It's just a matter of rallying that talent."

Michael Toto
Vice-president of corporate telecommunications
Johnson & Higgins
New York
and president
Association of Data Communications Users

Dialogue

What do you see as the advantages and disadvantages of entering a long-term, fixed-price custom net arrangement with a single carrier?

"The primary advantage of signing a custom network deal with one carrier is the cost-savings. However, I would make sure the final agreement contained a contingency that allowed me to break the contract if the network failed to meet performance expectations.

"Carriers today are offering a lot of value-added features to keep customers locked in. The industry is so competitive now that once carriers land a contract, they will deliver quality service to keep the customer loyal."

Robin McCrory
Director of telecommunications services
Samaritan Health Services
Phoenix

"Such deals lock users in and keep them from taking advantage of new developments in the industry. I would rather have the flexibility to switch vendors when new services that could enhance our network are announced.

"There are other ways of obtaining the savings of signing with a single carrier without making a major commitment. You can divide your network by group or division and test what each carrier has to offer."

George Tabback
Director of corporate information systems
Ingersoll-Rand Co.
Woodcliff Lake, N.J.

New ADCU leader pledges to form education program

Datacom group votes in new slate of officers.

By Paul Desmond
Senior Writer

BOSTON — The Association of Data Communications Users (ADCU) elected a new slate of officers at its annual meeting here two weeks ago, and its new president vowed to make the organization more valuable to members, in part by creating a formal education program.

Michael Toto, vice-president of corporate telecommunications at the Johnson & Higgins insurance company, was elected to a two-year term as ADCU president. He succeeds Lewis Haring, vice-president of The Chase Manhattan Bank, N.A.

Toto said he has already proposed that an education committee be formed to plan seminars and training programs on topics ranging from basic data communications to Integrated Services Digital Networks.

Other issues he plans to address are attracting new members to ADCU and strengthening support for the group on the regional level. "I want to build up our regional activities very strongly because that is really the backbone of our organization," Toto said.

The other officers elected at the meeting were Ronald West of Shearman & Sterling, 1st vice-president; Pat Ryan of Pitney Bowes, Inc., 2nd vice-president; James Stroud of Chase Manhattan, treasurer; Robert Connelly, of ADT, Inc., secretary; Garry Rasor of E-Systems, 1st director-at-large; and Michael Bousher of Chase Manhattan, 2nd director-at-large.

According to ADCU members who attended the group's closed

(continued on page 27)

GUIDELINES

BY ERIC SCHMALL

Good managers give credit where credit is due

To be successful, communications managers must build a reputation on the accomplishments of their staff members.

But many managers fail to recognize this and, instead, hoard all the credit. While that may provide some early career advancement, in the long run, it can only hurt a career.

Most managers have ample opportunity to steal the limelight from subordinates. Since managers must explain, interpret or otherwise convince superiors of the need for new initiatives, including communications-related projects, they can make what one might call "editing errors."

Names of individuals who made significant contributions may be left off written proposals. Subordinates' suggestions that have particular merit transform themselves into a manager's own ideas. The manager may even block staff members from making any formal presentations to the senior management team, closing off yet another avenue of recognition for workers.

Narcissistic managers become adept at identifying "management exposure" opportunities. These managers ensure that they play a central role in briefings to senior staff members.

While early successes may come easily, self-absorbed managers cannot survive at progressively higher organizational layers. In the wake of their success lay embittered subordinates and former associates who owe them no allegiance. Without their subordinates' sustained support, these managers will not be able to wield authority effectively.

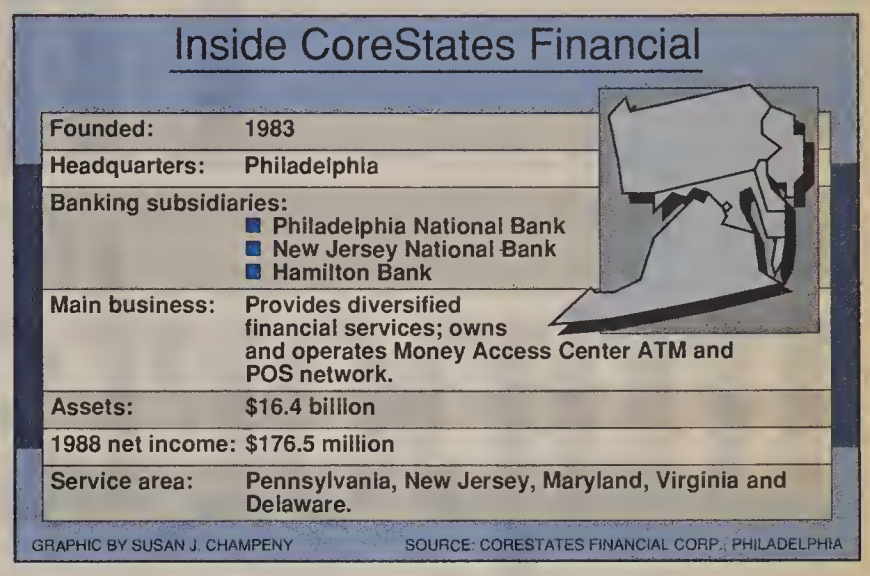
As if this weren't enough, this kind of manager also lacks the necessary team spirit so critical at the upper organizational levels. Senior managers are called upon to act and think selflessly. They must work closely and honestly with one another in pursuit of corporate goals. This concept is alien to the scene-stealing manager.

To thrive in management, one must constantly recognize the successes of subordinates. In this way, managers can foster teamwork and help assure their own upward mobility.

Schmall is network systems manager for an insurance holding company.

MANAGEMENT PROFILE

BY WAYNE ECKERSON



Bank holding company sees paperless future

By Wayne Eckerson
Staff Writer

PHILADELPHIA — CoreStates Financial Corp. is betting that electronic services will be the key to future growth in the banking industry.

Today, many of the services the bank holding company provides to customers still involve the exchange of paper. But CoreStates has developed the network systems and in-house expertise to compete aggressively in the electronic services market.

Last year, CoreStates drew 40% of its net income from transaction-processing services, such as wholesale funds transfers, and automated teller machine and point-of-sale network services. Next year, the company expects to draw 50% of its income from these services.

CoreStates' William Osterman

"Banking transactions today largely entail exchanging paper," said William Osterman, senior vice-president at CoreStates, a large regional holding company for three banking subsidiaries in the mid-Atlantic area.

"We foresee changing almost entirely to electronic means in the near future," Osterman said.

Already, the company has developed a variety of payment services that Osterman believes make the company a national leader in the nascent electronic payments market.

Core services

One service, CorePay, enables customers to submit payments electronically to the banks of their suppliers.

Customers use personal computers to transmit to CoreStates information about the payments that must be made to suppliers. CoreStates then translates these files into formats used by suppliers' banks and transmits the payment files over the automated clearinghouse network.

Through another service called CoreStream, CoreStates keeps a daily record of a customer's paper and electronic receipts and payments. CoreStates then consolidates these records into a single file, which it transmits to a customer's accounting office.

CoreStates has even formed a consulting service, called Electronic Data Interchange Consulting Group, which provides advice to customers that want to implement electronic payment systems or improve existing ones.

CoreStates believes that customers will flock to these electronic services as quickly as they abandon traditional lockbox services, which have been a core product at CoreStates.

Lockboxes, which in essence are post office boxes maintained by the bank, let customers reduce float time of checks that have been sent to them through the public mail. Customers usually authorize different banks in various regions to collect and deposit all checks sent to the lockbox.

"As lockboxes lessen in im-

(continued on page 27)

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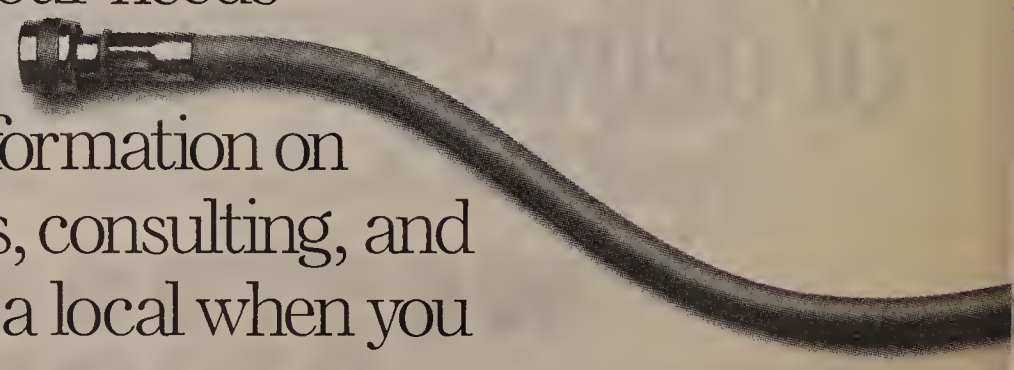

Network Systems®

Bank sees paperless future

continued from page 23

portance, customers will be looking for a single bank to consolidate their payments electronically. We plan to be that bank," Osterman said. "Top management has given us a mandate to become a national leader in electronic payments."

Big MAC

CoreStates owns and operates one of the nation's leading ATM networks, known as Money Access Center (MAC). Established in 1979, MAC comprises some 5,700 ATMs owned by 716 participating financial institutions in six states.

MAC also supports a burgeoning POS operation, which was established three years ago. Today, the network supports 10,000 POS terminals in gas stations, supermarkets and retail stores in Pennsylvania and neighboring states.

In March, CoreStates introduced MAC Medical Payment Service, a POS network serving the health care industry. Using POS terminals located in doctors' offices and hospitals, patients can pay bills with their MAC card instead of a check or credit card.

Competitive advantage

In the area of electronic services, CoreStates believes it has an edge over other large cash management banks that are beginning to invest in EDI and electronic funds transfer technology.

"We have invested heavily in electronic payments technology, and we have people with considerable experience in the field," Osterman said.

With CorePay, CoreStates hopes to attract customers that want the benefits of electronic payments but don't have the time, expertise or money to overhaul their existing accounts receivable systems, he said.

"CorePay gives customers entree to the world of electronic payments and gives us a growing customer base," Osterman said.

> "Top management has given us a mandate to become a national leader in electronic payments."
>
> ▲▲▲

Eventually, CoreStates expects customers will convert their accounts payable systems to conform with the ANSI 820 payment and remittance transaction set, Osterman said. ANSI 820 is an emerging EDI standard for transmitting electronic payments and remittance data.

Currently, customers transmit payment files from their personal computers to CoreStates over dial-up lines. Files are sent in batch using remote job entry 2780 or 3780 protocols. Customers specify the file format of their supplier's bank, and CoreStates performs the translation en route.

Also, customers can check the status of their payments using another service called CoreStation. CoreStation enables customers at a personal computer to dial into CoreStates' data center in Philadelphia to find out when payments were released to the Federal Reserve Bank of Philadelphia or to change a file payment format, Osterman said.

ADCU leader pledges to form program

continued from page 23

business meeting during the conference, members were concerned about getting more users to speak at conference sessions.

"It's something I've wanted from the group for years," said Timothy Simmons, manager of data communications at Reliance Insurance Co. in Philadelphia. "We're clearly going to have more user involvement" at conference sessions, Simmons said.

About one-third of the sessions at this year's meeting featured user presentations, while the remainder were dominated by vendors and consultants.

Users said the sessions would be more valuable if users discussed their networking experiences, both good and bad.

> "We need members to talk about what they've done, whether it's fame or folly," Toto said.
>
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"I fully agree that we need more member participation in the presentations," Toto said. "We need members to talk about what they've done, whether it's fame or folly."

Outgoing President Haring agreed that the group will try to focus on more problem/solution type sessions with user case studies but said, "that information is hard to come by. It's easy to get the vendors to talk, but it's a little tough to get the users to talk."

To help lure users into telling their stories, ADCU is considering conducting sessions on an informal, workshop-type basis separate from the annual meeting, Haring said. The group is also considering offering incentives to users who make presentations, although exactly what form those incentives may take has not yet been discussed, he said.

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- Enhancements to Network General's Sniffer network analyzer.
- A Higgins module that supports group scheduling across wide-area nets.
- Beckman Industrial's transmission medium tester for local net cabling.

First Look

IMC interface for Micro Channel bows

IMC Networks Corp. of Tustin, Calif., is developing a 32-bit Ethernet interface card for IBM's Micro Channel architecture.

The PCnic MCAbus is based on NCR Corp.'s new 32-bit 92C28 Ethernet controller chip and is believed to be the first 32-bit Ethernet interface to offer advanced data-handling capabilities.

IMC said the board will employ bus-mastering techniques to boost performance. Bus mastering — a feature of both the Micro Channel and the Extended Industry Standard Architecture bus being promoted by IBM's competitors — enables a coprocessor board to take over a computer's data bus as needed.

The PCnic MCAbus will be able to read data directly off the network and put it in system memory for processing, eliminating the need to buffer it on the interface board.

As much as 256K bytes of system memory can be configured as a buffer for the card.

The PCnic MCAbus is scheduled for shipment in September, and it supports both thick and thin Ethernet coaxial cable.

The initial release will include drivers for Novell, Inc.'s NetWare 2.1X and IMC's PCnic TCP/IP.

The board is priced at $995 and comes with a two-year warranty.

IMC Networks Corp., 1342 Bell Ave., Unit 3E, Tustin, Calif. 92680, or call (714) 259-1020.

(continued on page 31)

Analyzer for token-ring nets debuts

SAN JOSE, Calif. — Excelan, Inc., a wholly owned subsidiary of Novell, Inc., last week introduced a version of its LANalyzer Network Troubleshooter for token-ring local networks.

The LANalyzer is based on a NEC Corp. PowerMate Portable SX — powered by an Intel Corp. 80386 microprocessor — that is outfitted with an Excelan controller board.

The token-ring analyzer, which complies with 4M bit/sec IEEE 802.5 and IBM Token-Ring local net standards, can be used to analyze Layers 1 through 4 of the Open Systems Interconnection model.

Problems at the first, or physical, layer account for about 35% of network malfunctions, according to the company. These problems include excessive traffic, malfunctioning transceivers and improperly installed cables.

In contrast, the presentation, session and application layers, the top three, account for a combined total of less than 20% of net malfunctions.

For this reason, the LANalyzer gathers and analyzes such rudimentary statistics as token rotation time and ring recovery count.

"Without these low-level statistics, you don't know how well the net is performing," said John DeVries, Excelan product marketing manager. "These are the two most important things you could know."

LANalyzer features two real-time performance indicators, a global statistics monitor and a station monitor.

The global monitor enables users to track information such as the number of errors, token rotation time, total number of packets, total amount of data in the packets and number of token-ring recoveries. Ring recoveries are applicable when a token has been lost or broken and has to be reformed.

Global monitoring enables users to categorize network traffic by examining what percentage of packets fall into various size parameters measured in kilobyte levels. It also displays average and peak network utilization in one-, five-, 10- and 20-second intervals.

Station monitoring informs the net administrator of the number of packets and errors received and transmitted at as many as 600 stations. This capability enables real-time identification of a station causing a problem or bottleneck.

(continued on page 30)

Pack links PCs, PS/2s with VAXes

By Tom Smith
New Products Editor

BELLEVUE, Wash. — InterConnections, Inc. recently introduced client/server software that allows IBM Personal Computers, Personal System/2s and compatible workstations on Novell, Inc. NetWare local nets to communicate with Digital Equipment Corp. VAXes.

Terminal Emulation Services (TES) enables IBM Personal Computers and Personal System/2s to use various third-party programs to emulate VT-220, VT-240, VT-241, VT-320 and Tektronix, Inc. terminals while communicating with VAXes running VMS, according to InterConnections.

Installed on any workstation running NetWare 2.0 or higher, the TES client module enables users to log onto a VAX with a TES server module.

The server module is a software driver that interfaces with the DEC VMS Terminal Class Driver, making the I/O data stream from the personal computer appear as if it is coming from a VAX terminal. It supports VMS Version 4.6 and above.

The systems can be linked by either a server or a bridge.

The client module is an MS-DOS terminate-and-stay-resident program — it stays in memory even when the user has finished working on it — with a pop-up menu that lets users select and manage as many as nine terminal sessions. The module uses 45K bytes of memory and can be unloaded from personal computer memory.

TES is compatible with Ethernet, token-ring and Arcnet products from Novell, 3Com Corp., IBM and Ungermann-Bass, Inc.

Pricing for the client module is based on classes depending on the size of the VAX's CPU.

TES for a Class 1 VAX, such as a MicroVAX 2000, is priced at $2,000. TES for a Class 5 VAX, such as a VAX 8550, costs $12,000. The client module is free for all personal computers and Personal System/2s on the network. TES will be available in July.

InterConnections is located at 14711 N.E. 29th Place, Suite 100, Bellevue, Wash. 98007, or call (206) 881-5773.

Switch ties gear to mainframe channels

Bytex's Unity CS 32 Channel Switch links IBM mainframes to peripherals at 4.5M byte/sec.

By Jim Brown
Senior Editor

SOUTHBOROUGH, Mass. — Bytex Corp. recently announced a switch that enables IBM mainframes to share channel-attached peripherals such as disk drives, tape drives and channel extenders.

The Unity CS 32 Channel Switch supports speeds up to 4.5M byte/sec and, when configured as an A/B switch, can be used to connect multiple mainframe channels to a peripheral such as a laser printer. When the print job is finished, the user can enter commands on a front-panel keypad to connect another channel to the printer.

Alternatively, the product can be configured to switch peripherals from a failed channel on a mainframe to a backup channel.

The Unity CS 32 is like a matrix switch, which is typically used to switch communications lines from one attached front-end processor to another.

A low-end Unity CS 32 can be configured to share two peripherals among four mainframe channels. The largest Unity CS 32 can be configured to allow 32 host channels to share as many as 48 peripherals. Hosts and peripherals are interfaced to the switch with bus and tag cables.

Bytex does not currently plan to release a Unity CS 32 that supports the 100M byte/sec channel upgrade IBM recently announced (IBM option hikes 3090 channel rate," *NW,* June 5).

Users can configure the Unity

(continued on page 30)

Wang announces tool kit for image integration

By Tom Smith
New Products Editor

LOWELL, Mass. — Wang Laboratories, Inc. recently announced a development tool kit for integrating images into new and existing program applications as part of a larger effort to create a de facto standard for image processing in network environments.

Wang's Open/image architecture defines application program interfaces (API), image access protocols and the user interface needed to index, store, distribute and manage images.

The tool kit, Open/image-Windows, consists of 175 APIs for Microsoft Corp.'s Microsoft Windows 2.1 user interface and operating environment. The APIs provide the means to access, alter, store and manage image files, according to the company.

Storage and exchange of image files is handled using the industry-standard Tagged Image File Format. Dynamic Data Exchange, a Microsoft Windows capability for transferring information between applications, is also supported.

Image files may be stored on fixed disks, as well as on DOS-compatible, 5¼-in., write-once read-many-times optical disks, which can store between 5,000 and 6,000 optical pages.

Users can add notes to images running on Open/image-Windows with Wang's Freestyle system. Freestyle has an electronic tablet and pencil that customers can use to add written comments to typed notes. Images in the form of Freestyle pages can be returned to Open/image-Windows as either new images added to original files or as annotated replacements.

Open/image-Windows runs on IBM Personal Computer ATs and compatibles, including Wang's PC 200/300 Series. It supports personal computer local net operating systems from Banyan Systems, Inc., IBM, Novell, Inc. and 3Com Corp.

It will be available to users in early August. Pricing has not been set.

Wang can be reached by writing to 1 Industrial Ave., Lowell, Mass. 01851, or by calling (508) 459-5000.

Users can add notes to images running on Open/image-Windows with Wang's Freestyle.

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Call accounting software features real-time pricing, ad hoc reporting

By Tom Smith
New Products Editor

BURBANK, Calif. — Account-A-Call Corp. recently enhanced its Personal Computer Telephone Usage Management System (PC TUMS) with features that include real-time pricing and ad hoc reporting.

PC TUMS Release 5.1, a call accounting software package for IBM Personal Computers and compatibles, is the latest member of the PC TUMS 2000 family, the company's high-end line of telemanagement products.

Real-time pricing enables customers to use a personal computer to query the company's call accounting data collection devices and assign prices to calls as they are collected by the private branch exchange, rather than waiting for a full cycle to kick in the pricing function, according to Ricardo Brutocao, president of Account-A-Call.

Release 5.1's ad hoc reporting enables users to customize their reports by specifying certain elements within Account-A-Call's standardized reports. For example, a user might create a report showing calls to a specific area code or calls by extension without including pricing for those calls.

Another enhancement is a spreadsheet capability that enables users to download usage statistics directly into a program such as Lotus Development Corp.'s Lotus 1-2-3, Brutocao said.

Account-A-Call has reduced memory requirements for PC TUMS by approximately 75% compared with earlier versions through use of a data compression algorithm. That algorithm compresses data by 3-to-1 in Account-A-Call's Tadpoll or any other data collection device in use.

Other new features include call matching, which offers precise pricing and details on the routing of calls for organizations with multiple switches in dispersed locations.

PC TUMS Release 5.1 performs call detail recording at each site. It then employs an algorithm based upon trunks used, date, time and duration of call as well as the digits dialed to piece together the segments for analysis.

PC TUMS Release 5.1 can display an entire report horizontally, compared with other report formats, which are are about twice the width of a conventional computer screen. Reports can be created using a new laser graphics capability.

PC TUMS Release 5.1 will be available Aug. 1. Pricing starts at $6,500 for a low-end configuration serving one to 200 stations and about 20,000 call records. A high-end configuration supporting 2,500 or more stations and approximately 350,000 call records is priced at $23,500.

Account-A-Call can be reached in writing at 4450 Lakeside Drive, Suite 300, Burbank, Calif. 91505, or by calling (818) 846-3340.

Analyzer for token-ring nets bows

continued from page 29

Another feature of the new LANalyzer is prefiltering of packets, which lets users set criteria determining which packets will be captured and analyzed.

According to DeVries, users can define as many as 16 filters for each of eight channels and test for up to eight conditions at the same time.

Prefiltering provides more efficient use of a unit's buffer by cutting down the amount of data that needs to be stored.

The product also has a simultaneous send-and-receive capability, which allows the net manager to generate a data load for the network and monitor how it affects the network. These "stress tests" are helpful in planning network changes and additions, DeVries said.

LANalyzer has integrated protocol decoding for Transmission Control Protocol and DECnet networks. It also enables the setup of templates to decode packets according to the user's criteria.

The LANalyzer Network Troubleshooter system, including hardware, software and the NEC microcomputer, is priced at $19,995 and will be available in August. The LANalyzer kit for the IBM Personal Computer AT bus is priced at $9,980 and will also be available in August. It includes dedicated analysis hardware and LANalyzer software.

Excelan can be reached in writing at 2180 Fortune Drive, San Jose, Calif. 95131, or by calling (408) 473-8733.

Switch links gear to mainframe channels

continued from page 29

CS 32 via a front-panel keypad, or they can configure and monitor the switch from an IBM Personal Computer running Bytex's Unity Channel Control software.

Customers can also use an IBM Personal System/2-based Bytex Unity Management System to configure and monitor the Bytex Unity matrix switch and its Unity CS 32. The Unity CS 32 stores configuration information in nonvolatile memory. The product includes a redundant power supply that automatically begins operating when the primary power supply fails.

Pricing for the Unity CS 32 ranges from $30,000 to more than $500,000, depending on configuration.

Users can contact Bytex by writing to Southborough Office Park, 120 Turnpike Road, Southborough, Mass. 01772, or by calling (508) 480-0840.

First Look

continued from page 29

Network General upgrades Sniffer network analyzer

Network General Corp. of Mountain View, Calif., has added support for Apple Computer, Inc.'s LocalTalk protocol and AppleTalk Phase 2 extensions to its Sniffer network analyzer.

With the enhancements, Sniffer can be used as an analysis tool for corporate networks that are integrating LocalTalk work groups into Ethernet or token-ring environments.

The AppleTalk Phase 2 Protocol Interpreter Suite will be included in Version 2.3 of the Sniffer software, or it can be purchased as an upgrade to existing Sniffer units for $995. The LocalTalk software and hardware module, a hardware option for the Sniffer 500 series, is priced at $5,000.

Both Version 2.3 of the Sniffer software and the LocalTalk module will be available in September.

Network General Corp., 1945A Charleston Road, Mountain View, Calif. 94043, or call (415) 965-1800.

New Higgins module supports group scheduling across WANs

Enable Software, Inc. has enhanced its Higgins electronic mail product to support group scheduling across wide-area networks. While most group-scheduling systems require that each participant's schedule be stored on the same file server, the new Higgins module supports scheduling across multiple file servers. A built-in data base contains addressing and routing information for wide-area net addresses.

When an individual wants to schedule a meeting, Higgins retrieves the most convenient meeting times from the participants' personal calendars maintained on different local net file servers. The user then messages other meeting participants to set up the gathering. Special E-mail messages propose available times to users, who reply with their preferences. The meeting organizer only gets information about available meeting times, not the actual calendars, which remain confidential.

Users who do not store their calendars on a network server receive an E-mail message asking for a list of available meeting times. An override option lets the meeting organizer ignore apparent time conflicts and schedule a mandatory meeting that supersedes any individual's plans.

The new module runs 3Com Corp.'s 3+ and 3+Open, IBM's PC LAN Program and LAN Server network operating systems, and Novell, Inc.'s NetWare.

The advanced scheduling module will be included in the next release of Higgins, Version 2.3, which is scheduled for shipment in July. Prices start at $695 for an eight-user license.

Enable Software, Inc., 1470 Doolittle Drive, San Leandro, Calif. 94577; (415) 430-8875.

Beckman medium tester works on coax, twisted pair LANs

The Instrumentation Products Division of **Beckman Industrial Corp.** recently introduced a transmission medium tester for coaxial and twisted-pair local network cabling.

The **TMT-1 Transmission Medium Tester** performs a series of electrical tests in automatic sequence (Auto Test) or individually under operator control (diagnostic mode).

In Auto Test mode, the unit runs five tests in sequence: line map, which identifies twisted pair node connection; direct current resistance, which detects shorts and open circuits with resolution to 0.1 ohms; impulse noise, which can cause inconsistent communications; impedance, which measures resistance by the foot to pinpoint problems; and length, which measures cable distance up to 1,965 feet and locates open or shorted lines within one foot using time domain reflectometry.

Test results are displayed on a two-line, 20-character LCD.

TMT-1 can operate for up to eight hours on four internal NiCad batteries. It will also operate during recharge on an alternating current adapter or with standard C-size dry cell batteries.

TMT-1 is available now and is priced at $3,200.

Beckman Industrial Corp., Instrumentation Products Division, 3883 Ruffin Road, San Diego, Calif. 92123; (619) 495-3200.

Network Resources routers link Macintosh LANs to backbones

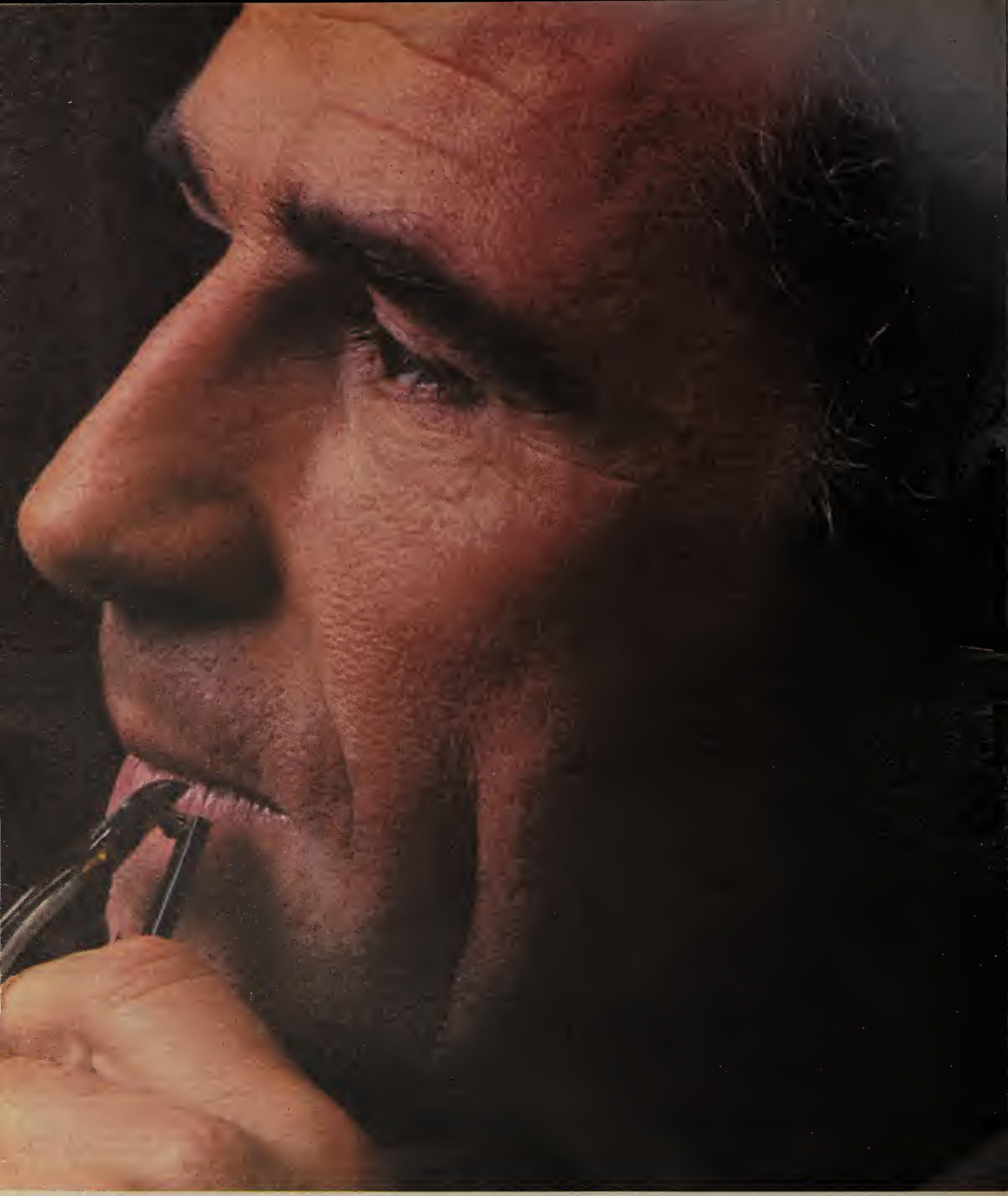
Network Resources Corp. of San Jose, Calif., recently announced a series of routers that connect Macintosh local networks to broadband, Ethernet or fiber-optic backbones.

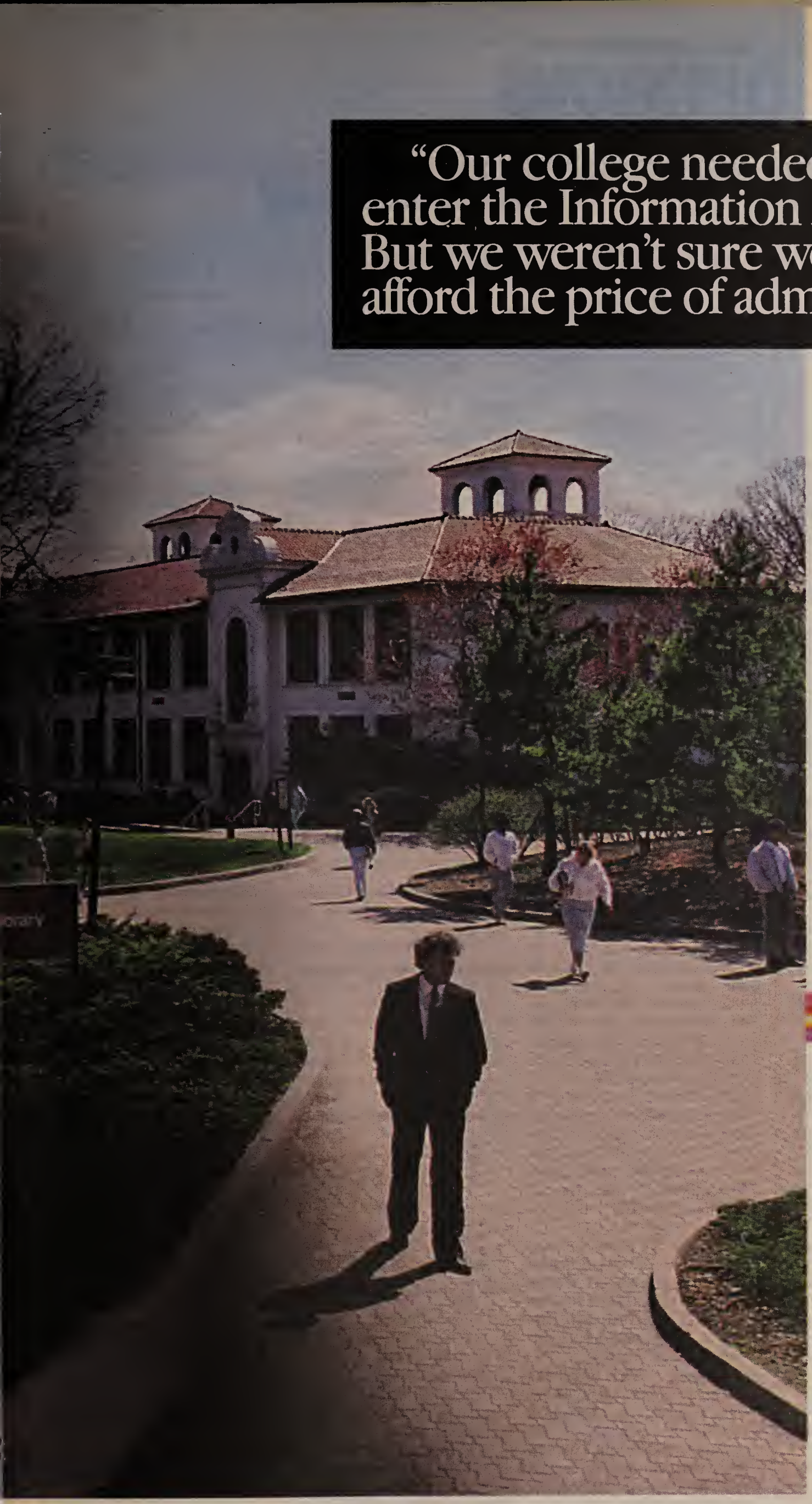
The AT2000 can be used to connect one AppleTalk device to the backbone, while the AT2002 can connect two devices, and the LT2000 can link an entire LocalTalk or PhoneNet local network to a backbone. PhoneNet, developed by Farallon Computing, enables AppleTalk to run across regular telephone cable.

The AT2000, AT2002 and LT2000 are each available for 2M bit/sec broadband, Ethernet or 2M bit/sec fiber-optic networks. They enable users to internetwork Macintoshes at speeds higher than LocalTalk's 230K bit/sec data transmission rate.

All three models of the AT2000 are priced at $995, the AT2002 costs $1,295, and the LT2000 costs $1,995.

Network Resources Corp., 2450 Autumnvale Drive, San Jose, Calif. 95131; (408) 263-8100.





"Our college needed to enter the Information Age. But we weren't sure we could afford the price of admission."

For an educational institution, nothing is more important than the smooth exchange of information. That's why many colleges are making information networking a top priority.

The toughest challenge is connectivity. Colleges and universities, like most places, acquire computers and telecommunications hardware in patchwork fashion, ending up with little or no compatibility.

For one northeast college, AT&T Network Systems, working with the local telephone company, demonstrated that ISDN was the solution. Their information services manager explained: "ISDN gave us the best capabilities for the least cost. And we didn't have to trash our existing systems."

With central office-based ISDN, ordinary phone lines become the links in a fully interactive network. This translates into many applications and benefits. Voice and data can be transmitted simultaneously. For example, students and professors can confer with the Dean, who has on-line access to student records. Electronic mail streamlines internal communication, so course enrollment changes can be posted immediately. PC/terminal access to host computers and electronic file transfer extend every user's access to sophisticated software and multiple databases.

As the college's IS manager puts it: "ISDN can revolutionize the education experience. It's going to make us a better college. And, bottom line, a more competitive college."

The Future's on the Line.

This college is just beginning to tap ISDN's potential. At AT&T, we believe this potential goes beyond today's need for improved communications to pave the way to a larger vision—Universal Information Services—a world of services on demand.

For more information, call the AT&T Futureline, 1-800-638-7978, ext. 0319

AT&T

The right choice.

OPINIONS

INTELLIGENT NETWORKS

BY JAMES CARLINI

The importance of having a high IQ

Some vendors and users think that ISDN is the last word — or should I say acronym — in communications solutions and that becoming an Integrated Services Digital Network is the ultimate destiny of the public switched network. This is not true. A new way of offering services to both residential and business users is on the horizon. The new buzzword users should be concerned about is "intelligent networks."

With intelligent networks, instead of a switch manufacturer developing a feature that resides on a switch, the telephone companies would develop the feature, which would reside in the network on processors collocated with the switches and linked to them. Using internal staff to develop and test code would enable them to create services.

The generally accepted belief is that the telephone companies will therefore benefit from having more control over the services they can offer; also, they will be more responsive to users. Users will be able to get new services faster. Everyone will win — or will they?

Many questions must be answered before declaring a win for either users or carriers. For example, who says the telephone companies have all of the intelligent network expertise on staff? Software development on a system such as the public network, which can't be shut down while people tinker with it, is not for novices. Telephone company workers have little experience with software development; they believe it to be just another skill that they can easily master.

Another potential downside for the user is that this feature customization can succeed only if all seven RBHCs and the local exchange carriers agree on standards and similar approaches, and that is not the case.

Here we have another classic example of engineers making the decision on a revenue-generating capability that affects users. Although some local exchange carriers are becoming more user-driven, their marketing organizations are not getting involved quickly enough in some of the technology decisions that will affect both users and the user companies' bottom line.

The pilot-testing of new services, faster response to user needs and dynamic market changes are just some of the areas that local exchange carriers' marketing organizations should review before they act on their network planners' ideas for intelligent networks.

For example, a scenario might unfold in which Local Exchange Company A has created a new intelligent network-based service offering for users. A business user might subscribe to the service and then want it at another location that is serviced by Local Exchange Company B. Company B cannot offer the service because it has a different approach to providing intelligent network-based services. Or worse yet, Company B is dragging its feet in implementing Signaling System 7 into its central offices because it cannot justify the upgrade. How would you rate that company's network IQ?

Users better start asking tough questions about the RBHCs' and local exchange carriers' adherence to standards, and they better start getting assurance on like capabilities across local access and transport areas. The local exchange carriers' marketing people won't have all of the answers, but they can get the network planners to consider issues they may have overlooked.

If users don't give input to those marketing people, the local exchange carriers' network planners will continue to design nets based on *their* own concept of what the user needs. Users interested in intelligent networks better talk to their representatives and find out what IQ level they can expect.

Carlini is president of Carlini & Associates, Inc., a management consulting firm in Hinsdale, Ill. He also lectures on information technology at Northwestern University in Evanston, Ill.

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EDITORIAL

Two new acts in the FCC drama

It seems the issues raised by AT&T's Tariff 12 just won't die.

Two weeks ago, MCI Communications Corp. and US Sprint Communications Co. appealed the Federal Communications Commission's April ruling giving AT&T the go-ahead on Tariff 12. (The appeals were filed with the U.S. Court of Appeals for the District of Columbia.)

The appeals by MCI and US Sprint are somewhat unusual, in that — technically, mind you — the FCC rejected AT&T's current custom network arrangements under Tariff 12. That, ostensibly, was what AT&T's rivals had sought.

But the FCC really endorsed the concept of Tariff 12. It said AT&T could continue offering service to current Tariff 12 users and modify the existing offerings to meet with agency approval.

Naturally, AT&T, which has made regulatory reform an underpinning of its competitive strategy, was delighted.

Naturally, MCI and US Sprint were not, and the two companies have brought the conflict into a larger arena.

All of this raises an interesting question.

Are MCI and US Sprint, as AT&T claims, using every means possible to delay AT&T's implementation of a legitimate competitive weapon — the custom network arrangement? Are the carriers unnecessarily creating doubt in the minds of users about a network offering that AT&T has a right to provide, an offering that even the FCC has blessed?

Or has the FCC, as MCI and US Sprint claim, failed to examine the issues raised by Tariff 12 in sufficient depth? Should AT&T be allowed to bundle services to provide discounts to large users? Are the arrangements — even the modified arrangements — structured so as to limit them to a single user?

> It's time to either kill Tariff 12 outright or leave it alone to prosper or die in the soil of the free market.
>
> ▲▲▲

The appeals court should act quickly on this issue. A resolution of Tariff 12 is long overdue. Users — particularly those entering into major network projects — need to know whether Tariff 12 is an acceptable option, a solution that comes without strings attached.

It's time to either kill Tariff 12 outright or leave it alone to prosper or die in the soil of the free market.

On another FCC-related note: The White House has finally made some progress in staffing the regulatory agency.

It's about time.

New appointments

President Bush has already named Sherrie Marshall, a Washington, D.C. attorney, and Andrew Barrett, a commissioner with the Illinois Commerce Commission, to the commission, and he is expected to name Alfred Sikes to the post of chairman.

As of this writing, Sikes heads up the Department of Commerce's National Telecommunications and Information Administration.

The agency has been in limbo since Commissioner Patricia Diaz Dennis' recent decision to remove herself from voting on more than a dozen major telecommunications issues. The positions to which Marshall and Barrett have been nominated have been vacant since 1987. That left only outgoing Chairman Dennis Patrick and Commissioner James Quello as voting members — not enough for a quorum.

It's disgraceful that the regulatory body that steers one of the most important sectors of the U.S. economy should have been left in the lurch for so long by the Reagan and Bush administrations.

One can only hope that the Senate moves quickly to ratify the appointments so the FCC can get on with the business at hand.

OPINIONS

ARTIFICIAL INTELLIGENCE

BY SUREN GUPTA

Expert systems can improve net management strategies

The art of buzzword bashing is nearly as popular as buzzword spreading. It's easy to dismiss new technologies as "solutions in search of problems." In many cases, such criticisms are justified.

However, artificial intelligence and its subset, expert systems, have been unfairly treated as laboratory subjects and technicians' toys. In fact, expert systems may solve many of today's more complex network management problems.

Black magic

Network managers practice a type of sorcery — mixing folklore, experience and somewhat incomplete data — to successfully operate a network. These seemingly magical methods can be analyzed and captured in the programmed rules of expert systems to solve many network management problems.

While several expert system-based net management tools are on the market today, no single system addresses all operational problems. Shell Development Corp. recently developed a diagnostic system for its nationwide communications network. AT&T has also developed several systems that perform different net management functions, including:

- Automated cable expertise, which reports cable trouble.
- An expert system for trouble analysis, which analyzes trunk outage codes.
- An expert system for trouble sectionalization, which locates faults.
- A network management expert system, which analyzes and displays congestion in the AT&T long-distance network.

The problem is that each of these systems addresses only a small fragment of the areas to which expert systems can be applied. An expert system that can address all the key areas of operations control in network management is needed.

Areas of importance

The goal of network management is supported by operational, tactical and strategic decisions and plans. To support these decision-making processes, the four key areas to which expert systems can be applied are:

- Network operational control for supporting operational decisions.
- Network administration for supporting tactical decisions.
- Network analysis and tuning for supporting tactical and strategic decisions.
- Network capacity planning for supporting strategic decisions.

As networks evolve toward intelligent elements with local autonomous control, the information required for analysis will not reside in centralized data bases. Important research into distributed knowledge bases and distributed expert systems must be done to provide a framework for distributed, cooperative reasoning so that various knowledge sources with different views can arrive at a coherent interpretation of data.

> Tomorrow's net managers will function in an environment with a vast combination of service offerings.
>
> ▲▲▲

Tomorrow's network managers will function in an environment with a vast combination of service offerings, extensive customer control and dynamic provisioning, routing and bandwidth selection. Intelligent systems will be essential in providing the analysis, advice and explanations for tasks of ever-increasing complexity.

Operational control of a network requires highly skilled, experienced employees. Because of the shortage and rapid turnover of qualified personnel, an expert system-based network management tool is now more necessary than ever. The use of expert systems will ensure high availability of the network through quick recognition of problems and performance degradation and through initiation of controlling functions when necessary.

Expert system technology is ready to tackle real-world problems. But the network operations and management systems of the future will require more — perhaps much more — intelligence than today's systems. Some important problems that need to be addressed are the requirements for:

- Frequent changes to a knowledge base because of dynamic network changes.
- Thousands of rules (unless rules are symbolically formulated) to monitor and maintain the volume of network elements.
- A fairly large number of instruments for identifying the actual network status.

Many of these unsolved problems can be addressed with network operations-oriented expert systems. The only mystifying factor that remains is why no vendor has addressed the issue of designing an integrated network management expert system that can help managers use expert knowledge in managing their nets.

Holding up the works

An expert system-based network management system has not yet been developed for two reasons. First, network management deals with complex issues such as performance, capacity and operational control. The problems associated with these areas are complex and intricate, but they can be solved.

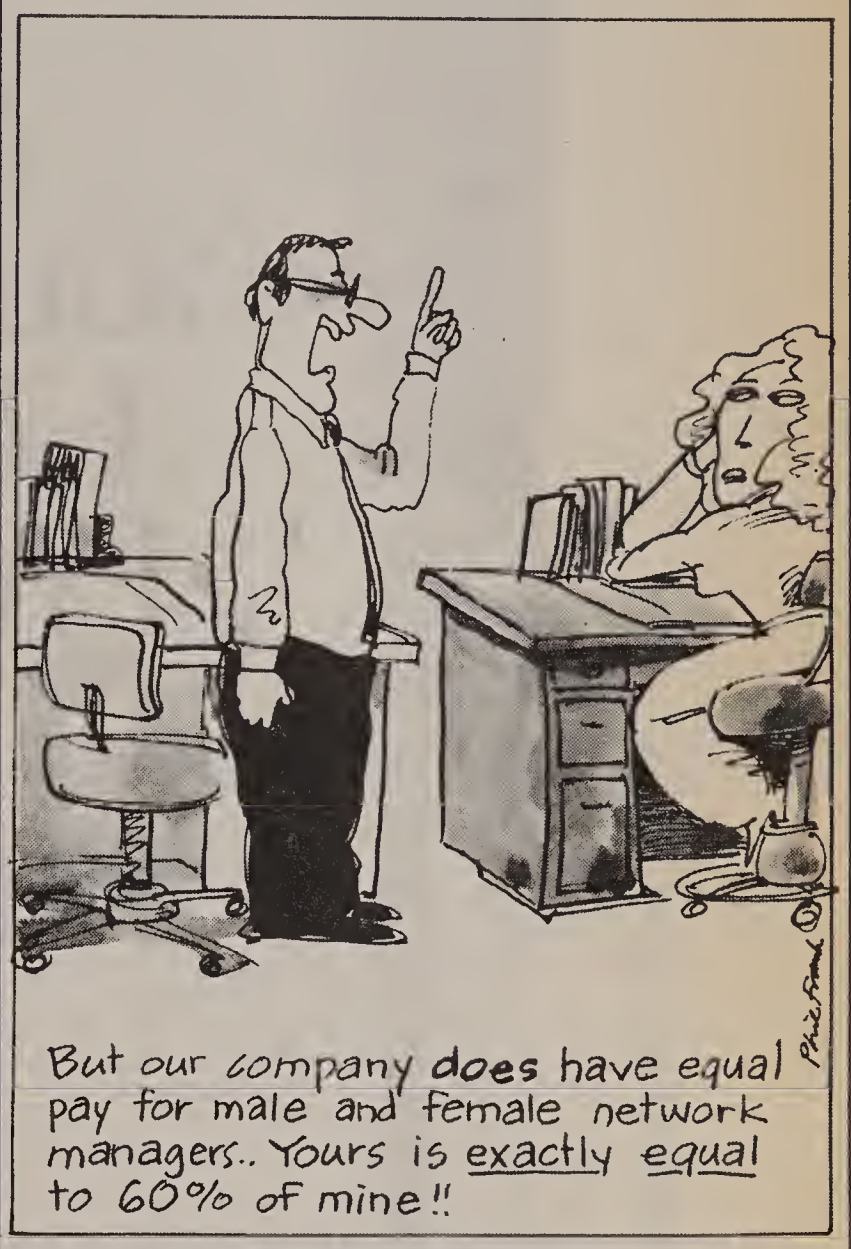
The second reason concerns the difficulty of interfacing an expert system with products in a multivendor environment. This problem can be addressed by an open exchange of product information between vendors. If two or more vendors form a strategic alliance, they can build a viable tool that will provide them with a powerful competitive advantage.

While the cost of developing an expert system-based network management tool is significant, it is relatively inexpensive considering the tool's marketplace potential. Most midsize user companies today typically spend hundreds of thousands of dollars to manage and maintain their communications networks. This expense could be avoided if two or more vendors worked together to build an integrated net management expert system. There is a vast market and a great demand for such a tool in the industry today.

Gupta is a senior consultant with Ernst & Whinney/Network Strategies in Fairfax, Va.

TELETOONS

BY FRANK AND TROISE



LETTERS

The technological solution

Your recent Pro/Con debating the issue of unsolicited facsimile advertising was interesting. However, the solution to this problem is not legislative, it is technical. In the best possible case, the potential recipient of a fax message should have the ability to decide whether or not to accept it.

Members of both TIA TR29, the U.S. standing technical committee responsible for fax standards, and CCITT Study Group VIII, the organization that oversees recommendations on fax worldwide, are currently discussing possible solutions to the problem of unsolicited fax messages.

One approach would be to design fax machines and add-on devices for existing machines that require the calling party to enter a code via the push buttons on the telephone (or the electronic equivalent). Fax machine owners who wanted to restrict incoming

(continued on page 64)

Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *375 Cochituate Road, Box 9171, Framingham, Mass. 01701.*

Letters may be edited for space and clarity.

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Manuscripts should be letter-quality, double-spaced and between 600 and 900 words in length. Disk or modem submissions are preferred.

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A White Paper by DCA

The Merging of PC LANs and 3270 Networks

A Prospe

MANAGEMENT INFORMATION SYSTEMS WEE

LAN Acquisitions Shift To Corporate MIS Level

By GEORGE BRIGGS

BOSTON—Two new trends emerging in the personal-computer local area network marketplace — a shift in who is buying the equipment and a subsequent refocusing of vendor selling strategy — together will change the nature of the LAN market permanently.

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PC MAGAZINE ■ OCTOBER 11, 198

PC WEEK — CONNECTIVITY

MICRO-MINI-MA

IRMALAN Products Establish DCA as Leader in LAN Mainframe Gateways

By David Strom

Digital Communications Associates' (DCA's) new IrmaLAN 3725 Gateway, IrmaLAN SNA Workstation version 2 and APA Workstation version 2 products are a big step for the Alpharetta, Ga., communications firm. With these new products, DCA has the strongest local area network (LAN) mainframe-gateway product line of any vendor, including IBM.

The new IRMA

MANAGEMENT INFORMATION SYSTEMS WEE

DCA Fulfills 10NET's Charter With Several LAN Products

By TERI ROBINSON

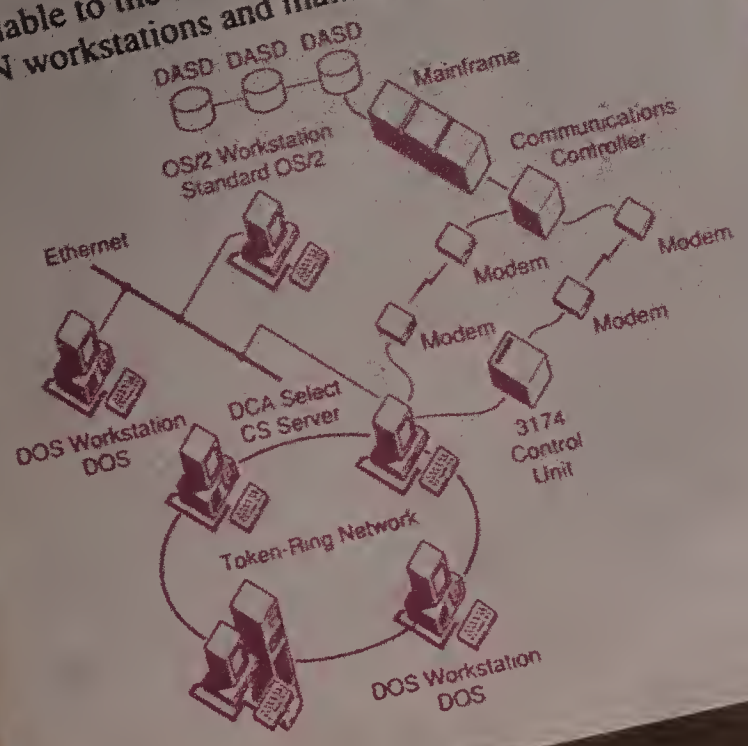
NEW YORK—10NET Communications, after be-

Digital Communications Associa-

10NET Plus: Everything PC LA Do Plus E-mail and Group Sch

PC HANDS ON

The following graphic depicts the many options available to the user with DCA Select CS for LAN workstations and mainframe connectivity.



Please send me additional information on DCA'S LAN Communications Products:

- ☐ DCA IRMALAN Gateways
- ☐ DCA IRMALAN Workstation Products
- ☐ DCA IONET Local Area Networks
- ☐ DCA IONET LAN Products
- ☐ DCA OS/2 Select Products

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In Georgia 404-442-4500, Ext. 51

DCA LAN Communications

Opening the OS/2 gateway

CONTINUED FROM PAGE 1

The first emulation products that gave personal computers access to VTAM hosts worked with only one computer at a time. These stand-alone products required that each workstation be physically attached somehow to the host with which it would communicate.

For businesses that have a single computer, this is fine. A large fast-food chain, for example, has one personal computer in every store. At night, each of these personal computers is used to send information to an SNA host. A stand-alone package is exactly what that company needs.

However, today it is more common for many personal computers to be connected to one another by a local-area network. One reason to install a local network in the first place is to share resources, such as modems and telephone lines. Software vendors have responded to this need by developing SNA local network gateways.

SNA gateways offer many advantages over stand-alone packages:

■ **Modem and telephone line sharing.** It would be absurd if every personal computer on a local net that had to log on to a host required a synchronous adapter, an RS-232 cable and a modem, although that is what the first release of OS/2 required.

It certainly makes a lot more sense to designate one personal computer on the local net as the gateway or hub, attach that personal computer to the host (via a communications facility) and route all host

(continued on page 62)

Mohen is an SNA specialist and consultant based in New York.

IBM's approach to linking OS/2 LANs to SNA is surprisingly unorthodox.

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Please allow four weeks for delivery.

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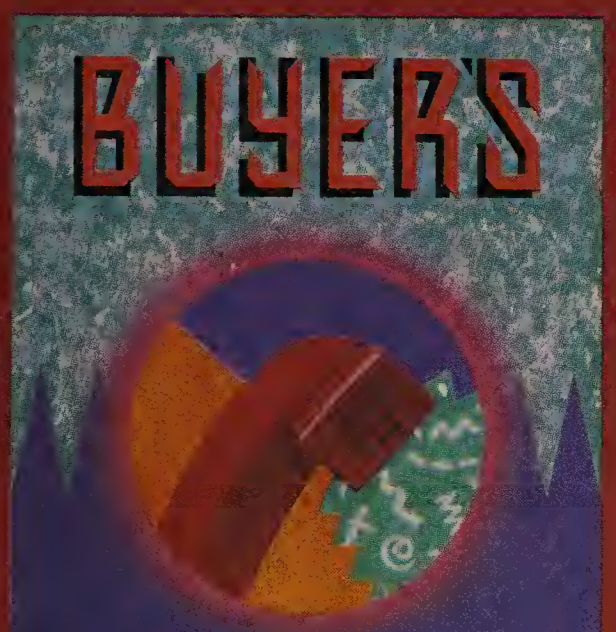

PBXS ABOVE 100 LINES

Staying power

The axiom that the race is won by the swiftest (that is, the most innovative) does not apply to today's midsize-to-large private branch exchange market. Instead, the race is being won by those manufacturers with the greatest stamina (that is, resources, support organization and established distribution).

This is not to imply that the successful manufacturers offer products that lack innovation, but rather that PBX buying decisions are now frequently influenced by factors that outweigh the products' existing and promised capabilities. One of these factors will always be price, but the strategic, heavily discounted pricing in which all vendors are currently engaged puts system price in a separate category — one that should be analyzed after all other factors have been considered.

CHART • GUIDE

The features and prices of various private branch exchanges are listed in a chart beginning on page 42.

Recent studies show that the important criteria, other than system capability, are:

- The length of time that the distributor has been in business.
- The size, experience and breadth of the distributor's service or support organization.
- How closely the distributor is tied to the system's manufacturer, or if they are one and the same.

(continued on page 44)

Rafferty is vice-president and Rubenstein is a consultant with The Aries Group/MPSG, a telecommunications consulting firm located in Rockville, Md.

Stability, not price, is winning users for PBX vendors.

By VINCENT F. RAFFERTY AND SUE R. RUBENSTEIN

PBXs above 100 lines

Vendor	Product	Maximum size (stations)	Central processor	Blockage	ETN package or equivalent	Direct T-1 interface/ Remote modules	Maximum data transfer rate (bit/sec)	LAN interface/ Host interface	ISDN capabilities	ACD with MIS reporting	Retail (Centralized Attendant Service)	Lodging/ Healthcare	Integrated voice mail	Estimated cost per line (installed)
AT&T Bridgewater, N.J. (201) 221-4000	Definity Generic 1	1,600	16-bit, redundancy optional	Traffic-engineered	ETN	Yes/Limited (one module within 3 km)	19.2K asynchronous, 64K synchronous	ISN, Starlan/DMI	PRI, future BRI	Yes	Yes	Yes	Yes	$550 to $1,000
	Definity Generic 2	32,000	16-bit, redundancy optional	Traffic-engineered	ETN	Yes/Yes	19.2K asynchronous, 64K synchronous	ISN, Starlan/DMI	PRI, BRI	Yes	Yes	No	Yes	$600 to $800
Ericsson Business Communications Richardson, Texas (214) 669-9900	MD 110	12,000	Multiple 8-bit, redundancy optional	Traffic-engineered	ETN-compatible	Yes/Yes	19.2K asynchronous, 64K synchronous	No/DMI	PRI announced	Yes (OEM)	Yes	No	Yes (OEM)	NA
Fujitsu Business Communication Systems, Inc. Anaheim, Calif. (714) 630-7721	Focus 960	2,000	8-bit, redundancy optional	Traffic-engineered	No	Yes/Yes	19.2K asynchronous, 9.6K synchronous	No/No	None	Yes	No	Yes	Yes	$450
	Omni SI/SIII	2,000	16-bit, redundancy optional	Traffic-engineered	ETN-compatible	Yes/No	19.2K aysnchronous, 64K synchronous	Yes/No	None	Yes	Yes	Yes	(OEM)	$400 to $700
	F9600	9,600	16-bit, redundancy standard	Nonblocking	ETN-compatible	Yes/Yes	19.2K asynchronous, 64K synchronous	No/No	ISDN-compatible	Yes	Yes	No	Interface	$250 to $800
Hitachi America, Ltd. Norcross, Ga. (404) 446-8820	HCX 5000	3,000	16-bit, redundancy optional	Nonblocking	None	Yes/Yes	19.2K asynchronous, 19.2K synchronous	No/No	PRI	Yes	Yes	No	Interface	$600 to $800
	DX Series	3,064	16-bit, redundancy optional	Traffic-engineered	None	No/No	19.2K asynchronous, 9.6K synchronous	No/No	None	No	No	Yes	Interface	$600 to $800
Rolm Santa Clara, Calif. (408) 986-1000	IBM 9751 CBX	20,000	32-bit, redundancy optional	Nonblocking	ROLMnet III	Yes/Yes	19.2K asynchronous, 64K synchronous	No/No	None	Yes	Branch only	Yes	Yes	$650 to $1,000
InteCom, Inc. Allen, Texas (214) 727-9141	IBX	16,384	32-bit, redundancy standard	Nonblocking	ETN-compatible	Yes/Yes	19.2K asynchronous, 64K synchronous	LANmark/ DMI	PRI, future BRI	Limited MIS	No	No	Interface	$500 to $1,000
Mitel, Inc. Boca Raton, Fla. (407) 994-8500	SX 200 Digital PABX	500	16-bit, nonredundant	Nonblocking	MSDN	Yes/No	19.2K asynchronous, 64K synchronous	No/No	None	Yes	No	Yes	Interface	$600 to $1,050
	SX 2000	2,500	32-bit, redundancy standard	Traffic-engineered	MSDN	Yes/No	19.2K asynchronous, 64K synchronous	No/No	PRI announced	Yes	No	Yes	Interface	$600 to $900
NEC America, Inc. Melville, N.Y. (516) 753-7000	NEAX1400 Information Management System	448	16-bit, nonredundant	Nonblocking	None	No/No	9.6K asynchronous, NA synchronous	No/No	None	No	No	Yes	Interface	$600 to $700
	NEAX2400 Information Management System	23,184	16-bit, redundancy optional	Nonblocking	EPN	Yes/Yes	19.2K asynchronous, 64K synchronous	Announced/ No	PRI announced	Yes	Yes	Yes	Yes	$600 to $1,050
Northern Telecom, Inc. Richardson, Texas (214) 437-8589	Meridian SL-1 ST/RT	600	(ST) 16-bit, nonredundant, (RT) 24-bit, redundant	Traffic-engineered	ESN	Yes/Yes	19.2K asynchronous, 64K synchronous	LANSTAR/ CPI	PRI	Yes	Yes	Yes	Yes	$650 to $850
	Meridian SL-1 NT/XT	7,000	24-bit, redundancy standard	Traffic-engineered	ESN	Yes/Yes	19.2K asynchronous, 64K synchronous	LANSTAR/ CPI	PRI	Yes	Yes	Yes	Yes	$650 to $800
	Meridian SL-100	30,000	16-bit, redundancy standard	Traffic-engineered	ESN	Yes/Yes	19.2K asynchronous, 56K synchronous	LANSTAR/ CPI	PRI and BRI announced	MIS interface	Yes	No	Interface	$700 to $900
Siemens Information Systems, Inc. Boca Raton, Fla. (305) 994-8100	Saturn IIE/III	700	16-bit, redundancy optional	Nonblocking	No	Yes/No	19.2K asynchronous, 64K synchronous	No/No	PRI (Cornet) announced future BRI	Yes	Yes	No	Yes (OEM)	$400 to $1,000

ACD = Automatic Call Distributor
BRI = Basic Rate Interface
CPI = Computer to PBX Interface
DMI = Digital Multiplexed Interface
EPN = Electronic Private Network
ESN = Electronic Switched Network
ETN = Electronic Tandem Network
ISDN = Integrated Services Digital Network
MSDN = Mitel Superswitch Digital Network
NA = Information not available
PRI = Primary Rate Interface

This chart includes a representative selection of vendors in the private branch exchange market. Most vendors offer other PBXs, and many vendors not included offer a full range of competitive products.

SOURCE: THE ARIES GROUP/MPSG, ROCKVILLE, MD.

WHEN YOUR PEOPLE HAVE SO MANY DIFFERENT COMPUTERS TO CHOOSE FROM, WHERE DO YOU DRAW THE LINE?

(continued from page 41)

■ Whether an ongoing relationship can be established with the vendor.

■ Whether the manufacturer has enhanced or evolved the PBX, or if the system might be "orphaned" in favor of newer technology. This last criterion has increased in importance in the last several months with the pending acquisition of Rolm Systems Division by Siemens and the recent news concerning Wang Laboratories; Inc.'s desire to sell InteCom, Inc. Such decisions cause users to seek greater stability in the vendor and manufacturer they select to provide their PBX.

When asked to identify the criteria he uses to select a vendor for both telecommunications and data communications equipment, Eric Strassman, MIS manager for Becton Dickinson Diagnostic Instrument Systems of Towson, Md., lists the following:

■ A deep, financially strong organization.

■ Both technical and nontechnical skills.

■ Market awareness.

■ An effort to understand customers and their requirements.

■ Strong ties to the manufacturer of the product being offered.

Strassman also says that the length of time the vendor has been in business and has been offering the product is important since it indicates stability and product familiarity.

The current user desire for a stable PBX vendor limits competition by segmenting vendors into three categories: those that are direct sales arms of manufacturers, those that have extremely close ties to a few select manufacturers and those that are offering something more than a simple PBX solution.

Special relationships

According to Joaquin Gonzalez, a principal with Ernst & Whinney/Network Strategies in Fairfax, Va., users want to "nurture a strategic relationship with a vendor — a relationship based on trust." Gonzalez says that vendors are recognizing this trend and are aggressively pursuing what he calls "special relationships" through high-level executive forums, in-depth briefings on plans and future offerings, and specialized contracts for both products and services.

These special relationships are beneficial to both users and vendors, providing each with a high degree of leverage. Users receive specialized treatment, including price incentives, expanded service options and planning assistance, as part of the vendor's commitment to be more responsive to their needs.

In return, vendors receive long-term commitments for their products and services, a secure installed base to enhance and grow, and a reduced competitive threat. Most importantly, these relationships provide vendors with an insider's view of the marketplace and a test bed for new technologies.

> Users want to "nurture a strategic relationship with a vendor," Gonzalez says.
>
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Once the user has determined that vendors can offer longevity and stability, the selection process becomes one of evaluating similar capabilities and determining whether such differences are truly critical (see chart on page 42). All of the midsize-to-large PBXs provide virtually identical features; these include voice/data integration, digital instruments, customer administration, integrated voice messaging, automatic call distribution (ACD), networking, direct T-1 access and the promise (if not the availability) of Integrated Services Digital Networks.

At the station level, this may involve evaluating such items as the number and size of programmable feature buttons; the size, clarity, brightness and functionality of the alphanumeric display; the steps required to program speed calling; the quality of the speakerphone; and the weight of the instrument, to name a few. While these may seem relatively unimportant in the overall PBX evaluation, every telecommunications manager will attest that such factors directly relate to user acceptance, satisfaction and full system feature usage.

> System administration is a big ticket item that continues to increase in importance for PBX users.
>
> ▲▲▲

That's the ticket

While often difficult and time-consuming, evaluating and comparing other items, such as individual features, circuit card density, shelf configuration and attendant functions, is also an important and cost-affecting process. How often have users purchased systems on the assumption that all features operate similarly? Only after the system has been installed does the user discover that a critical feature, such as call forwarding, is too complex to activate.

The feature then goes unused, forcing changes in company operation to compensate for it. How frequently has a user been forced to add a shelf or cabinet, at post-cutover prices, because the equipped configuration could not accommodate another digital line card?

System administration is a big ticket item that continues to increase in importance for PBX users at all sizes and levels of complexity. Users are demanding ease of use in PBX system administration. No longer do they find the simple ASCII terminal and code-based input acceptable.

Users now demand, at a minimum, workstations or microcomputers that offer user-friendly system administration. That means simplified English language input, task-oriented menu-driven formats and screens, online help and storage of configuration data. Additional requirements include the ability to accommodate both real-time and scheduled input, multiple users, multitasking, standard data base management programs, alarm alerts and status reports.

Fortunately, many PBX vendors are responding to user demands for a sophisticated yet simple-to-use system administration capability. Recently, AT&T, Northern Telecom, Inc., Fujitsu Business Communication Systems, Inc. and Hitachi America, Ltd. introduced new system administration and management capabilities that incorporate many of the most desired features in their PBX product lines.

Other manufacturers, such as InteCom, have indicated that they will also upgrade system administration facilities. Further, we have seen a growth in third-party providers, such as XTEND Communications Corp. and Forte Communications, that offer system management packages for PBX systems.

Much more to do

While the future seems bright with regard to system administration, a great deal still remains to be done. Users, particularly those with multilocation nets, want relational data base management functions, more customization of reporting capabilities and complete network management.

According to Gonzalez, "ease of systems management is the most important issue facing communications managers today." He indicates that these managers face the task of controlling and monitoring multiple elements in their networks from a centralized location. As a result, they are asking for a single, integrated system that manages all elements.

Again, manufacturers and vendors are making efforts to respond to these demands. AT&T offers the Accumaster Integrator, Northern Telecom has recently announced Meridian Network Control, and IBM has NetView and NetView/PC. However, while these are major steps in the right direction, all currently lack various pieces as well as the openness required for truly integrated systems management. Most analysts agree that integrated systems administration and management will be the most dynamic and fastest growing area in the communications arena during the next several years.

The ISDN factor

ISDN integration and compatibility is another issue influencing both user and consultant evaluations of PBXs. To some, it is only one element that must be addressed in some fashion to ensure that the system selected will be viable in the future. To others, it is what Geoffrey Tritsch and John Powers of Powers Tritsch & Associates, Inc., a consulting firm in Wellesley, Mass., call the "supreme roadblock" in the evaluation process since it causes users to delay decisions and retain their current system until more information is known.

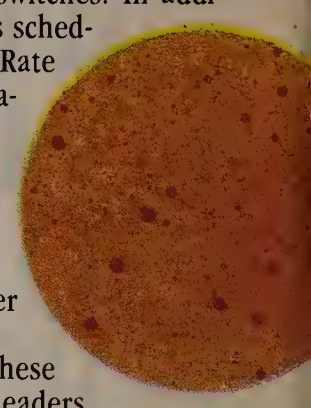
> "ISDN is the impetus for Centrex," according to Tritsch.
>
> ▲▲▲

For some users, particularly those with digital Centrex in their networks or requiring such functions as station identification and automatic number identification (ANI), ISDN is a key item of evaluation. And finally, for a few, it is inconsequential because it adds no new functionality to existing capabilities.

However, no matter what the perspective may be, the issue of ISDN compatibility and connectivity will increasingly dominate the system evaluation process. All of the major PBX manufacturers either have announced or are delivering ISDN capabilities.

AT&T and Northern Telecom have taken the high ground by delivering ISDN in the form of Primary Rate Interface access that can be connected to AT&T's Definity 75/85 and Northern Telecom's Meridian SL-1 and SL-100. Furthermore, both companies have defined and implemented various applications, such as AT&T's call-by-call selection and Northern Telecom's Meridian customer-defined networking, that make practical use of the ISDN Primary Rate Interface.

On the Basic Rate Interface front, both AT&T and Northern Telecom offer their proprietary Basic Rate Interface packages and terminals on their respective central office switches. In addition, AT&T has scheduled its Basic Rate Interface capability for Definity Generic 2.



With one exception, all of the other manufacturers are following these two market leaders. Hitachi, Fujitsu, InteCom, Mitel, Inc., NEC America, Inc., Siemens and Ericsson Business Communications have announced and scheduled delivery of either or both the Primary Rate Interface and Basic Rate Interface for their product lines. Only Rolm, which has announced that its system will be compatible with ISDN when the standards are more completely defined, has not scheduled ISDN delivery.

For the regional Bell holding companies and other telephone companies, "ISDN is the impetus for Centrex," Tritsch says. This is because the new ISDN packages (such as 5ESS Generic 5E4.2 and DMS-100 BCS 27) offer integration and functionality equivalent to that available with current PBXs.

Most importantly, this includes such capabilities as fully integrated Basic Rate Interface telephones, integrated voice/data/packet transmission over a single pair of wires and full network transparency. The RBHCs' ability to offer ISDN digital Centrex and other capabilities such as integrated ACD with management reporting and on-site user administration is causing many users to reevaluate Centrex.

Hype vs. reality

ISDN is being market-driven rather than user-driven. It is imperative that prospective PBX buyers examine very closely all ISDN claims and commitments, as the hype often exceeds the reality. ISDN capability is evolving and will continue to evolve for many years. Therefore, due to modifications in standards and technology, the ISDN functionality purchased and installed today, or even next year, may not be fully compatible with the ISDN to be offered five years from now.

However, evaluating ISDN is no different than evaluating other functions or capabilities of a PBX. Inherent in the purchase decision is the anticipation that the system will last its expected life, that it can be enhanced and upgraded to meet evolving user needs, and that it will easily support future technology.

To mitigate some of the risks associated with this decision, many PBX manufacturers are

(continued on page 50)

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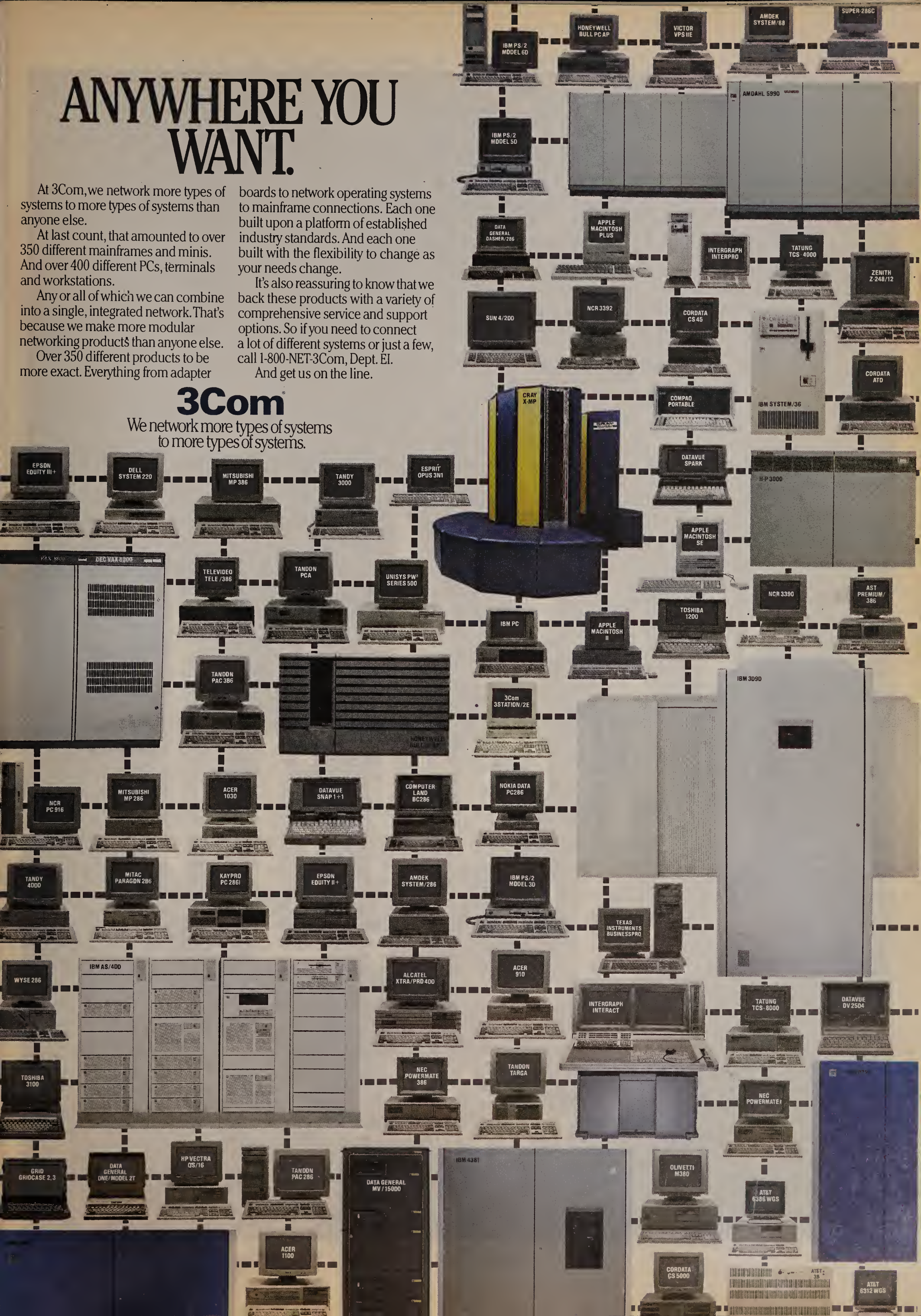

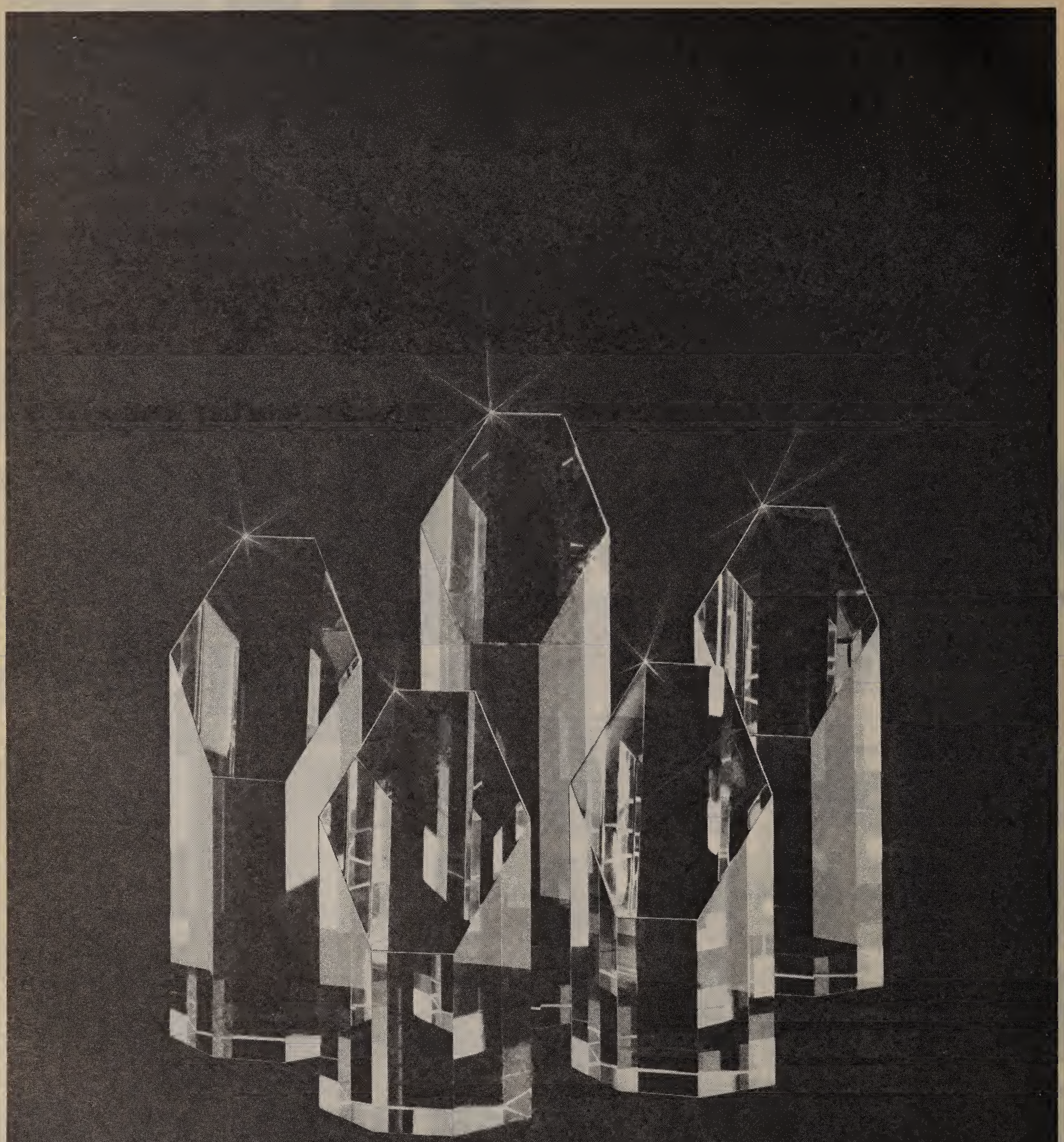

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Global: Internetworked LANs/WANs connecting international sites.

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Medium-sized VARs: Annual sales between $5 and $10 million
Large-sized VARs: Annual sales over $10 million

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U S WEST® COMMUNICATIONS

(continued from page 44)
now building systems designed to be platforms for existing and future communications services and capabilities. The systems are built around a commercially available processor architecture, such as an Intel Corp. 80286, and a standard operating system, such as Unix.

Manufacturers forecast that this design will allow an elegant upgrade to the next generation of processor, portability of software and associated applications, and the ability to interface with all manner of current and future applications processors through the emerging Open Systems Interconnection standards.

AT&T's Definity 75/85, Hitachi's new HCX5000, Northern Telecom's Meridian SL-100 SuperNode and Fujitsu's F9600 are examples of systems based on this design philosophy. Users would be well advised to monitor this trend as they select PBXs during the next few years.

As for future trends, two new capabilities will probably be implemented in PBXs within the next 12 to 18 months. The first will be a direct interface capability to the new fractional T-1 services that several interexchange carriers are offering. This has become a hot topic for many users since it addresses the need for cost-effective digital transmission and has the potential to eliminate high-cost voice and data private-line services.

At the local exchange level, fractional T-1 also has the potential to replace simple off-premises extension analog lines with integrated digital off-premises extension line circuits. This, of course, would require that local exchange carriers also offer some form of fractional T-1, which they claim they are reluctant to do at this time. However, they will "suddenly discover" that the Basic Rate Interface, with its two DS0 channels, is actually a fractional T-1 variation.

The other capability that will soon appear in PBXs is the integration of local-area network bridges and routers. Even though all current PBXs provide integrated data switching and transmission, most users have opted to use this capability sparingly. Instead, users are installing local nets for both intra- and interdepartmental data communications.

Increasingly, there is a need to link such local nets, and many third-party vendors are offering stand-alone local network bridges/routers.

To capture a share of this growing market and prove that the PBX can be the "integrated office controller" that it has been touted to be, several major manufacturers are said to be preparing to introduce fully integrated local net brouters into their PBX systems.

These products are expected to offer sufficiently high bandwidth and the conversion resources necessary to provide communications among multiple local networks.

Coming attractions

In addition to new capabilities, users can anticipate the introduction of new PBX systems from several manufacturers, including InteCom, Toshiba America, Inc. and Siemens. Also, users can expect Northern Telecom to announce a major architectural upgrade for its Meridian SL-1 product line within the next 12 months.

These anticipated announcements, along with the recent introductions previously mentioned, demonstrate that the PBX market is not as static as some reports indicate. Both products and players will continue to change, and users will continue to face a difficult decision-making process.

Clearly, the issues of ISDN integration, open architectures, enhanced functionality and applications and systems management will dominate the product side of decisions. However, the most important decision criterion will be the vendor. Users will base their selection on how comfortable they feel with the vendor as they initiate a long-term relationship.

Users can anticipate the introduction of new PBX systems from several manufacturers.

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What is to become of the IBM 9751?

Some of the dust has settled since December's dynamite announcement that IBM would sell one-half of its interest in Rolm Corp. sales and marketing, as well as Rolm's manufacturing and development arm, to Siemens AG of Munich, West Germany. Assuming the deal is consummated, everyone wants to know how international strategy will influence real-life decisions.

For the immediate future, we can accept at face value the declared intentions of both IBM and Siemens to continue to market and support existing product lines. IBM stresses that its 50% stake in Rolm sales and marketing will give it a vested interest in continued product development and support. For Siemens, the IBM 9751 CBX fills a product line gap for which Siemens has no alternative product ready for the U.S. market.

Taking the long view, it is clear that some product changes must occur. We only have to look at recent history to see how Siemens streamlined a variegated product mix when it acquired Tel-Plus Communications, Inc. in 1987. Besides the IBM 9751 CBX and its own Saturn line of private branch exchanges, Siemens has contractual obligations to sell NEC America, Inc.'s NEAX 2400 Information Management System.

Complicating matters further, Siemens is developing the World Systems Series, an Integrated Services Digital Network-compatible PBX based on the Hicom, its high-end European PBX.

Siemens has stated its intentions to integrate the best of the Rolm and Hicom technologies, perhaps choosing to retain such praiseworthy components as PhoneMail and RolmPhones. In addition, Siemens could use Rolm's feature applications knowledge to incorporate functions such as automatic call distribution.

However, integrating Rolm and Siemens technology will not be easy due to the different processor architectures and Rolm's nonstandard international signaling format with its 16-bit word, 8-kHz sampling scheme. The more widely accepted international format uses an 8-bit word, 8-kHz sampling scheme.

In addition, even if a crossover technology becomes available, Siemens will have to either support the installed base of two divergent PBXs or phase both out in favor of a new, third choice. The more likely scenario is that one existing technology will be targeted for oblivion.

The likely loser is the one with nonstandard internal signaling, archaic motherboard architecture, awkward T-1 connectivity and lack of ISDN technology. Rather than put more research and development dollars into a long-term upgrade of the IBM 9751 CBX, Siemens could refocus all those well-trained Rolm developers toward bringing the World/Hicom to the U.S. market.

— Vincent Rafferty with Sue Rubenstein

Expanding ISDN call services

By JOHN HUNTER

Integrated Services Digital Network hasn't been the marketing success many people predicted, and it won't be until some hard questions have been answered.

Even though some of the regional Bell holding companies are offering central office-based ISDN services, few user companies will commit to ISDN or shell out serious money for equipment until they're sure a high level of service is available.

What troubles many users is the uncertainty surrounding the level of expanded call services, or supplemental services. Users are wondering whether services such as call camp-on and call conferencing will be available to companies implementing private branch exchange-to-private branch exchange and PBX-to-exchange ISDN. They are also asking whether service requests can be passed throughout the network (user requests for supplemental services will be issued over the D-channel).

If the carriers and PBX vendors can't furnish the desired services between ISDN and different vendors' switches, people aren't

(continued on page 54)

For ISDN to provide full functionality between dissimilar PBXs, standard codes must be developed to handle supplemental service requests.

The ISDN

tur product implemen...

Showcasing ISDN applications

BY JEAN S. BOZMAN
CW STAFF

COTTSDALE, Ariz. — AT&T last
eek drew major computer vendors into
s quest for MIS and tele...
pport for ISDN techn...
After years of prepar...
e to showcase Integ...
gital Network (ISDN) a...
uipment from such main...
s as Tandem Computers,
uipment Corp. and Wang La...

T&T executives demonstr...

that gathers calls from multiple user loca-
tions — even those in an IBM Systems
Network Architectur...
can exchange...

An ISDN Opportu...

EDITORIAL

...telephone companies and end users gathered in Scotts-
...this month to get a firsthand look at what AT&T
...industry-specific ISDN applications, they

technology But the
Oddly enough, AT&
the consultant and p
What AT&T did
attendees at NetPow
program, AT&T mov
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Admittedly, this p
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ISDN applications come alive at ICA

Dawn Bushaus, Assistant Editor

Vendors at the International Communica-
tions Association convention last week
...telecommunications history when
...demonstrated a live
...using

AT&T, others offer we...
of ISDN products at de...

By John Cox
Senior Editor

SCOTTSDALE, Ariz. — AT&T
last week demonstrated a battery
of new and existing Integrated
Services Digital Network prod-
ucts at NetPower '89, an exhibi-
tion designed ...
nesse...

features such as Incoming
Line Identification. Pri...
$995, the product will be
able in April.
NetLine, Inc ...

HOTEL USES ISDN TO STREAMLINE CHECK-IN SERVICES

he Harrah's Reno
uest Service Center
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eractive live video to
pedite guest
ervations. It's a joint
rt made possible
he hotel, Nevada
and AT&T.

GUESTS arriving at Reno Can-
non International Airport
now can make instant reser-
vations at Harrah's Reno by utilizing an
interactive live video system.
It is the first time this technology has
ever been used in the hospitality indus-
try anywhere in the world.
While passengers are waiting for their
luggage to arrive from the plane, they
can check into Harrah's ...
make reservations for ...
range to ...
TV ...

appear on the main screen in front of
them.
Individuals using Harrah's ...
Guest Service Center who ...
about what type of room ...
look at all their choices ...
TV screen.
Another ...

ICA ISDN Demo: Ne...

EDITORIAL

There was a lot of talk and, actually, a lot of action about
integrated services digital networks at the International Commu-
...conference in Dallas last week
...ICA ISDN showcase,
...Bell Telephone Co.,
...of ISDN techno-
...
...the trouble to ...
...'s West ...

At times during the sev...
Southwestern Bell technici...
considered the impossible
work, or, at the least, tha...
Indeed, a week ago, as t...
Microcom Inc. officials co...
that the AT&T 5ESS switc...
demo wasn't working exa...
supports ISDN at Microco...
Some fine-tuning was ne...
integrated song.
More than fine-tuning ...

AT&T confirms, expands ISDN commitments

AT&T To Let Telcos Offer Users Free ISDN

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Net-
work Systems last week said it will give
its telephone company customers the
chance to provide their users with free
ISDN service on a trial basis.
AT&T introduced its Customer Oppor-
tunity Program at last week's NetPower
'89 trade show here, which featured
AT&T central office equipment and third-
party supplied applications for integrated
services digital networks (*Communica-
tionsWeek*, March 13).
AT&T Network Systems' new pro-
gram is a two-pronged offering that will
let the company's Bell operating com-
pany and other telco
customers introduce
end users to ISDN—at
AT&T's expense

under which telcos, end ...
are developing ISDN ...
Although AT&T's ...
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NetPower event, it was ...
highlight.
Robert Cooper, ente...
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'A 'try it; you'll like it' ...ach' may be the

AT&T To Spotlight 11 ISDN Applic...

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Network Systems
plans to showcase 11 new ISDN applications for tele-
phone companies and business customers at the first
NetPower '89 ISDN forum here this week.
Although AT&T in the past has been involved in
forums covering integrated services digital networks,
NetPower '89—AT&T's own event—is different, an
AT&T spokeswoman said. The company will highlight
industry-specific solutions it developed in cooperation
with local telephone companies and third-party vendors,
using off-the-shelf products.
"This is a way to explain to telcos and end users how
ISDN centrex can make the PC [local area network] more
productive," she said.
Each of the 11 applications will be demonstrated in
settings that depict elements typical of that environment,
including customer premises equipment. The security
application, for instance, will include a security guard
location, a security supervisor office and a central se-
...location.
...and software from AT&T, Compaq
...Hilgrave Inc. and

NETPOWER '89 PARTICIPANTS

Source: AT&T

...research and development and
...The vendors used
...AT&T's

AT&T spokeswoman.
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ISDN products and ser...
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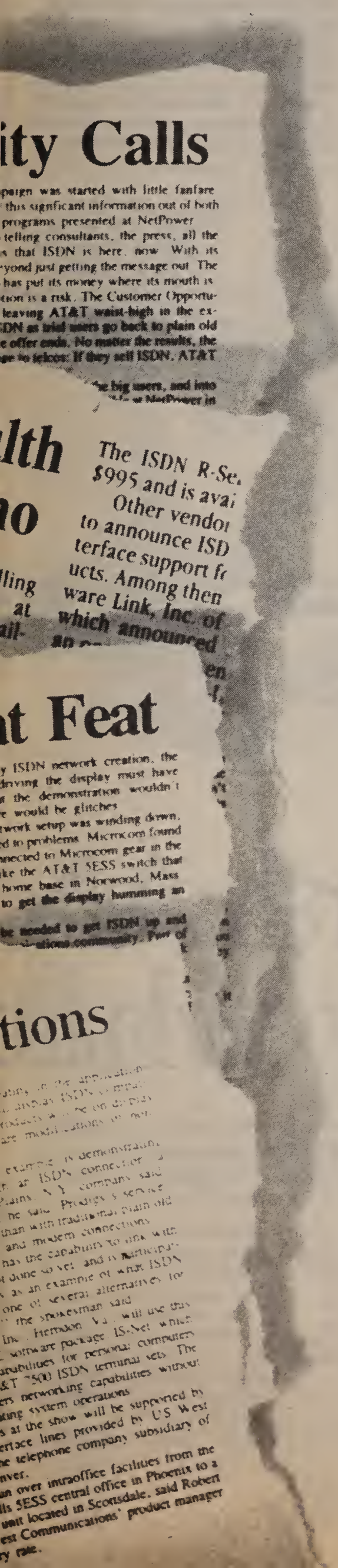

Who's really putting ISDN on the map? If you've seen the headlines, you know the score.

You only have to scan the trade press to see who's the clear-cut ISDN leader. The company that helped build the standards for ISDN. The company that's helping local telephone companies turn the promise of ISDN into Real-World Solutions. The company: AT&T.

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AT&T
The right choice.

(continued from page 51)
going to buy ISDN.

PBX manufacturers and carriers both realize that ISDN without supplemental services will be a hard sell, and they aren't going to wait for something formal to be handed down by the Consultative Committee on International Telephony and Telegraphy. "In the absence of a standard, vendors are implementing their own proprietary services," states Roger Bushnell, director of marketing for business services at Northern Telecom, Inc. The RBHCs are doing it too, he says.

Still, the lack of supplemental service standards is making potential ISDN customers nervous. They see ISDN more as a digital facility and less as an integrated network service, as vendors implement their proprietary facilities.

Sure, proprietary protocols will pass with no problems over public ISDN facilities employing homogeneous PBXs. With similar PBXs using the same software, it's a simple matter to use a supplemental service. The user merely enters the correct codes or strikes the right function key, and the PBX sends the appropriate message. People have become accustomed to such calling services on their local PBXs.

> The concern about interconnectivity is that there are no standards regarding the protocols and encoding for supplemental services.
>
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But users also want to be able to issue a supplemental service request over a hybrid ISDN facility consisting of heterogeneous equipment with the assurance that it will be delivered to the target location.

Without standards for protocols and message encoding — or at least an agreement among PBX vendors and carriers as to which services will be supported and what protocols will be used — supplemental services won't work over ISDN. Potential customers know that some form of compromise will be hammered out but fear that functionality will be sacrificed.

No standards for services

The source of concern about interconnectivity is the fact that there are no universally accepted standards regarding the protocols and encoding for supplemental services. The CCITT groups consisting of the European Computer Manufacturers Association (ECMA) and the ANSI T1S1 committee are studying supplemental services.

The 1988 CCITT IX Plenary Assembly Blue Book contains some 31 recommendations dealing with direct-inward dialing, two types of call line identifications, two types of connect line identifications, three types of call forwarding identifications, call conferencing, call waiting and call transfer procedures.

However, "none have been implemented yet," according to Scott Augerson, Siemens AG's director of product management. Augerson says the T1S1 committee is studying call forwarding, call line service, line hunting, call completion — busy subscriber (or call camp-on, for short), call waiting, multiline precedence preemption, call hold, call conferencing, call transfer and user-to-user signaling. None have been agreed upon yet, according to Augerson.

Ultimately, ECMA and ANSI will forward their findings to the CCITT. Then after some discussion and compromise, ISDN supplemental service recommendations will be published in the CCITT Q.932 and Q.933 documents. However, ratification of the recommendations isn't scheduled until the 1992 plenary session.

Vendor directions

For customers wishing to implement ISDN services using homogeneous PBXs, there are a variety of proprietary protocols

> There's a wide choice of proprietary protocols that will provide a rich set of supplemental services.
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that will provide a rich set of supplemental services. Further, all of the PBX vendors interviewed have indicated their intention to implement CCITT recommendations once they're ratified.

AT&T now employs a proprietary protocol for supplemental services with its System 75 and 85 but states that this protocol will be replaced once industry standards have been established. "We interact with ISDN users groups now and also support ECMA. In the future, we'll migrate to Q.932 and Q.933," states Frank Young, AT&T division manager for ISDN planning.

Siemens is also committed to Q.93X but, in the meantime, employs its CorNet proprietary protocol to furnish services.

"We've already implemented Q.931, and our [supplemental] services are based on an educated guess as to what Q.932 and Q.933 will look like," Augerson says.

Siemens has identified 87 services and will begin implementing them sometime this summer. The initial CorNet will be for Primary Rate Interface, but a new version that supports Basic Rate Interface is coming. The Basic Rate Interface will support Info-2 and call-by-call services now tariffed by AT&T Communications, Inc.

Info-2, short for Information Forwarding-2, is an option for Megacom 800 and provides incoming call number identification. Call-by-call service allows the customer to designate individual channels within a T-1 composite to be routed among different carrier services such as Megacom, Megacom 800 and Accunet switched services in order to accommodate fluctuations in traffic.

Northern Telecom's Electronic Switched Network (ESN) system used with the SL-1 and SL-100 PBXs offers a Q.931 Primary Rate Interface and a proprietary protocol for supplemental services. The EMS-110 and DMS-100 switching systems, on the other hand, support both Basic and Primary Rate Interfaces and Signaling System 7 (SS7) for supplemental services.

"We'll be offering call setup, call conferencing, key system emulation, call forwarding and call waiting in the second half of this year," says Northern Telecom's Bushnell. "Our services are constantly evolving, and we'll be consistent with BELLCORE recommendations," he adds.

Siemens has identified 87 services and will begin implementing them sometime this summer.

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Ericsson, Inc. now uses the British Telecommunications PLC-developed Digital Private Network Signaling System (DPNSS), an interconnect standard based on the seven-layer Open Systems Interconnection model. DPNSS is used extensively in the U.K. and is gaining acceptance in Europe.

According to Mikael Nillson, Ericsson's product manager for data communications, Ericsson is following CCITT closely and will support it once recommendations have been released.

DPNSS now has a set of supplemental services and, therefore, is an alternative for companies not willing to wait for CCITT. However, Nillson notes that DPNSS diverges from the Q.921 and Q.931 Primary Rate standards beyond the physical layer (Layer 1); "therefore, a gateway will likely be needed for integration with CCITT ISDN."

Another DPNSS implementor is Mitel, Inc. Its modified version, Mitel SuperSwitch Digital Network (MSDN), differs from DPNSS in that it was designed to work with North American T-1, according to Leo Lax, assistant vice-president for ISDN marketing at the company. Lax says MSDN supplemental features resemble Q.932 but states that if there are differences, Mitel will furnish translation software.

The BELLCORE technical recommendations are built around SS7.

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It should be noted that all other PBX vendors interviewed also said that such translation services will be provided if the CCITT recommendation proves to be incompatible with theirs.

Exchange compatibility

With PBX vendors using proprietary protocols and standards that are years away from completion, potential ISDN customers planning on using a hybrid of public network and private services can justifiably question whether the public ISDN service can furnish a rich set of supplemental services. They may also ask whether they can issue supplemental service requests using their PBX's protocols and encoding schemes.

The BELLCORE technical recommendations are built around North American SS7 and CCITT SS7, says Ray Hapeman, chairman of the T1S1 committee and a technical manager with BELLCORE in Red Bank, N.J. SS7 is thought of primarily as the vehicle for call setup and disconnections and for signaling between central offices.

However, SS7 also contains a Transaction Capabilities Applications Part (TCAP) that permits supplemental services to be established. TCAP is not new to the RBHCs; it currently supports credit-card calling and 800-number data bases in North America. Further, TCAP, when used with SS7, has call camp-on, call forwarding and centralized attendant services.

According to Hapeman, a great deal of work is being done on PBX-to-exchange supplemental services, but "we've got a way to go before anything is implement-

(continued on page 63)

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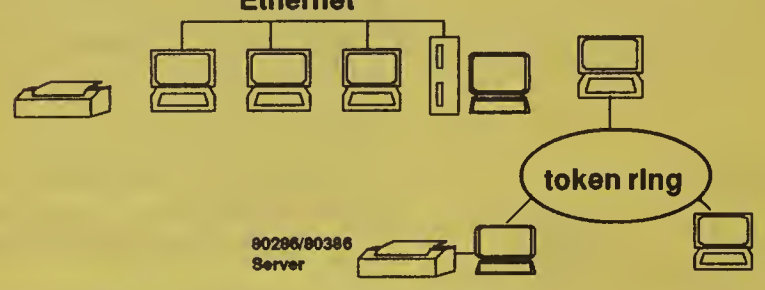

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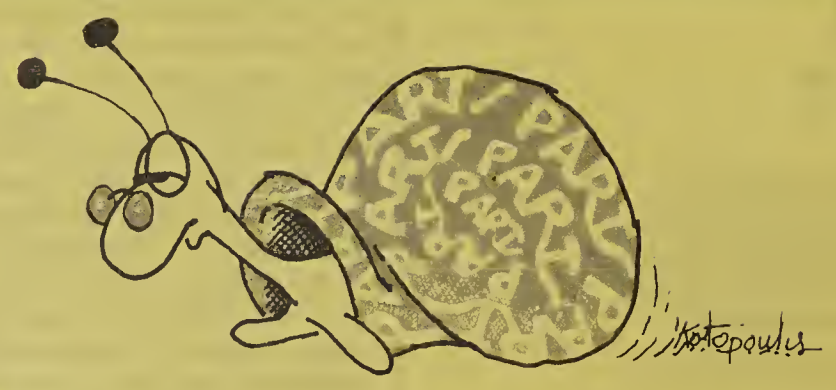

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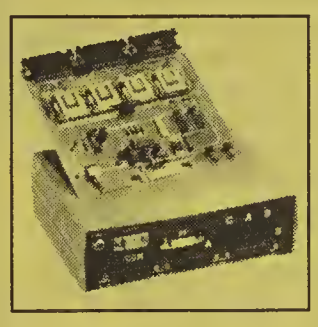

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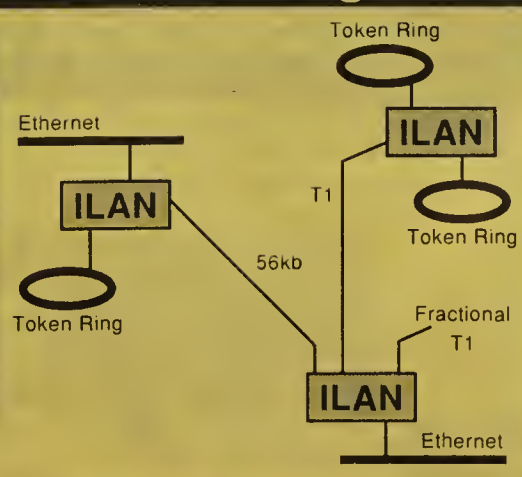

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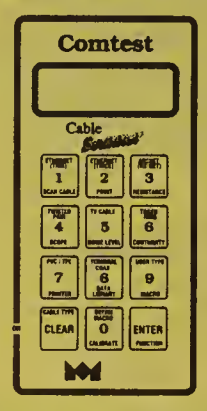

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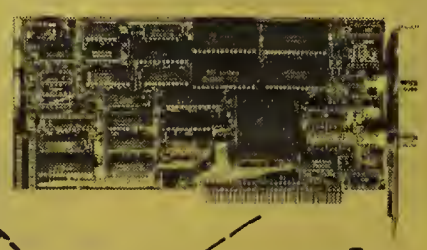

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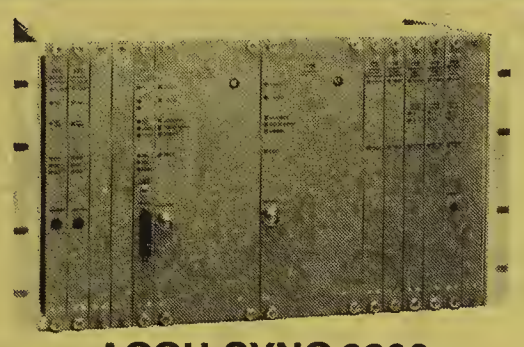

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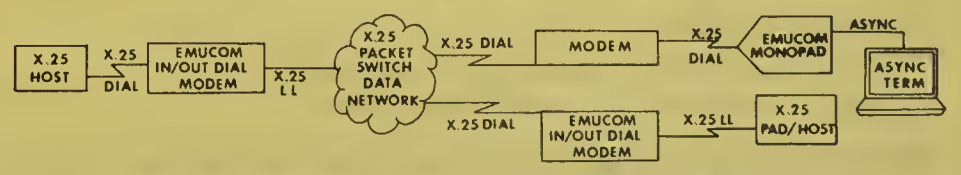

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(continued from page 39)
traffic through that personal computer. The gateway personal computer implements the entire SNA protocol stack.

■ **Reducing memory requirements in the workstation.** While the gateway personal computer usually has to be loaded with memory, other personal computers on the local network do not need extraordinary resources.

The only part of SNA that needs to be in the end user's computer is a portion of the top layers; some experts call this the protocol boundary. This can reduce the memory requirements of SNA from 180K to 30K bytes.

■ **Improved network management.** The gateway approach tends to generate fewer trivial alerts to NetView. This is important since it reduces extraneous messages appearing on the NetView console.

■ **Simplified host resource definition.** Fewer nodes have to be defined in the network control program (NCP) generation.

■ **Improved link utilization and performance.** This occurs because the host needs to poll only the gateway personal computer, not each workstation individually.

■ **Simplified cluster controller and front-end processor resource definition.** The token-ring adapter address must be preconfigured for the gateway only, not for every personal computer on the local network. Not only does this save work when the gateway is first installed, but also when personal computers are added or moved.

Nearly all SNA gateways today need only one physical unit, or node, for the entire local-area network (see Figure 1). There are usually one or two logical units for each end user (such as one 3270 logical unit and one Advanced Program-to-Program Communications logical unit), all of which access the host through the same gateway. Eicon Technology Corp., Network Software Associates, Inc., 3Com Corp.'s Communications Solutions, Inc., and Novell, Inc. all use this approach.

IBM has decided to pursue a radically different technique for its own OS/2 SNA LAN Gateway (see figure on page 1). But to understand it, it is important to appreciate IBM's unique design objective.

OS/2 Extended Edition has a Database Manager, which, among other things, allows users to access data on an OS/2 server transparently. For communications between requester and server, IBM uses APPC.

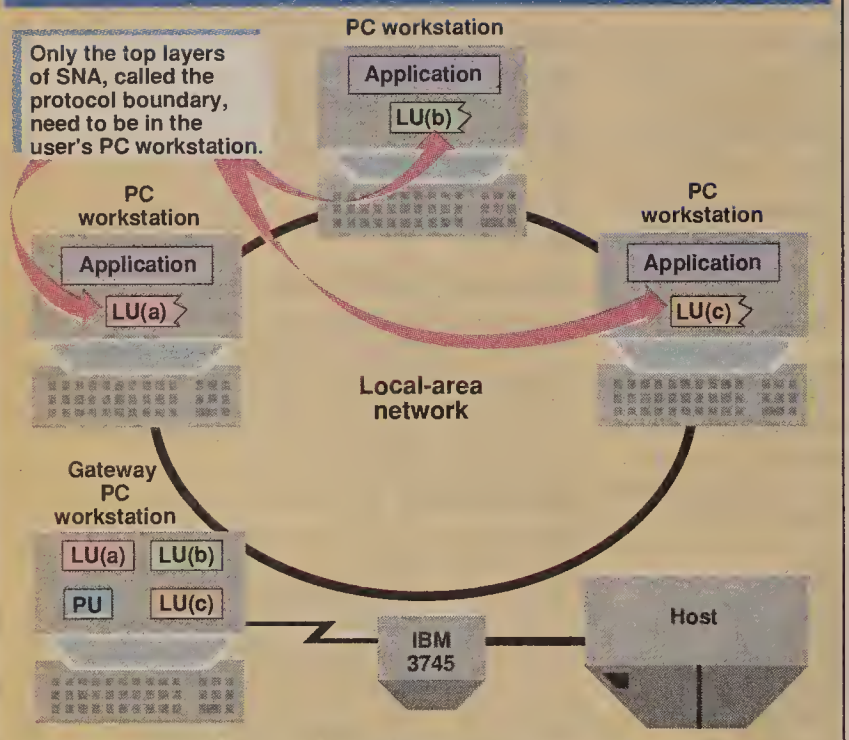
In other words, IBM actually uses SNA LU 6.2 sessions for Database Manager communications between personal computers, even over the same local net. It chose APPC (instead of Network Basic I/O System or Named Pipes) because in the future it plans to allow mainframes and Application System/400s to act as servers as well, and APPC is indigenous to those types of computers; NETBIOS is not.

This means that true SNA sessions have to exist between personal computers on an OS/2 local network, at least in IBM's plan. For that to happen, each and every personal computer on the local net must contain the entire SNA protocol stack.

Put another way, every personal computer on the local network must contain its own physical unit.

Therefore, IBM OS/2 local net gateways can't split the protocol stack the way competing products do. It also means that users will need a much more powerful personal computer. About 6M bytes of real memory is needed just to bring up one 3270 and one APPC session, and even more memory is required once the Database Manager gets rolling.

Conventional DOS SNA gateway
Figure 1



In the conventional MS-DOS SNA gateway, there is only one PU (in the gateway). Most of the LUs are also in the gateway, which serves to minimize memory overload in the workstations.

GRAPHIC BY SUSAN SLATER SOURCE: JOSEPH MOHEN, SEACLIFF, N.Y.

Also, it would have been a disaster if IBM had designed the gateway so that the OS/2 local net appeared to the host as a gigantic multidrop line, polling 100 different physical units on the same line. So IBM designed the gateway product so that the OS/2 SNA gateway would appear to the host as one PU Type 2, with as many as 254 logical units.

Downstream from the host, there actually would be a physical unit and at least one logical unit in each personal computer. The SNA gateway would hide the additional physical units from the host.

Upstream, the gateway personal computer looks like a host to the other personal computers. It can look like a Synchronous Data Link Control front-end processor or a 3725 Token-Ring Interface Coupler.

This implies that other DOS SNA emulators, including PC 3270 Version 3 and APPC/PC, can attach to the host through the same gateway. Third-party emulators probably would work as well.

Now that we understand the reasons behind the OS/2 Extended Edition SNA gateway's unorthodox design, we can look at the technology that will ultimately replace the SNA gateway as we now know it — namely that OS/2 will become a network node (see Figure 2). This enhancement to Extended Edition will be made within the next two years and will radically change the way we view SNA gateways, personal computer connectivity, front-end processors and SNA itself.

To understand what is happening, we first have to find a common ground between the front-end processor, the personal computer SNA gateway and even the cluster controller. They all perform the same job: intermediate routing.

In a generic sense, each of these takes downstream devices or computers, and routes messages to and from these and another computer, such as a host.

The front-end processor's purpose has traditionally been to off-load from a host computer the mundane tasks associated with telecommunications. But when you think about it, the front end is conceptually an intermediate routing node, steering traffic between peripheral nodes and hosts.

> Nearly all SNA gateways today need only one physical unit for the entire LAN.
>
> ▲▲▲

An SNA personal computer local network gateway routes messages between networked workstations upstream to a host and back again.

A cluster controller such as a 3274 routes messages from dumb terminals attached via coaxial cables and passes those messages up and down to a mainframe.

So although the front-end processor, personal computer SNA gateway and cluster controller perform intermediate routing with different architecture and design, the general function is the same.

In the past, the architecture used for intermediate routing varied by node size. SNA defined mainframes, minicomputers and terminal controllers. Today's SNA gateways essentially still emulate terminal controllers. One reason for the different routing architectures was that they made it easy to differentiate between a front end and a peripheral node. Today the distinction is blurred.

Is an AS/400 Model B60 a minicomputer or a mainframe? Is a VAX 8800 a minicomputer or a mainframe?

The correct answer to all of the above is that the answers are unimportant, at least to the data communications specialist. A consistent set of protocols is needed; IBM knows this and has developed just that.

The AS/400 and System/36 already can perform intermediate routing using a product called Advanced Peer-to-Peer Networking (APPN). The cluster controller currently being developed to replace the 3174 will also offer APPN support. While APPN is actually a software package, it is also the prototype of an architecture called PU 2.1 Network Node.

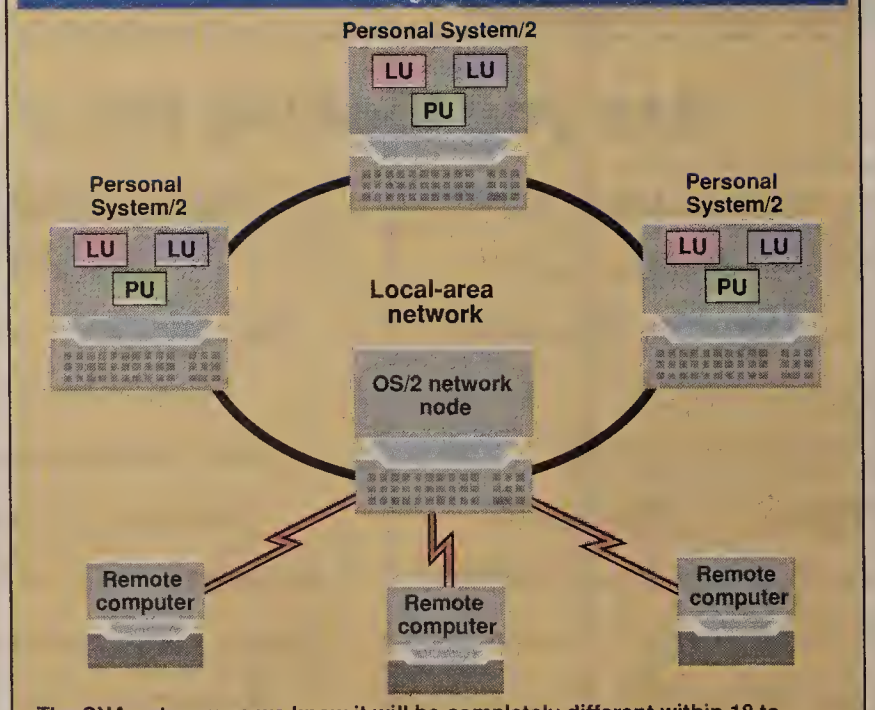
In the future, computers on the network will be classified as either a peripheral node, which cannot do intermediate routing, or a network node, which can.

MS-DOS based gateways will continue to use the technique of putting the SNA protocol stack in the gateway only, since the conservation of memory is paramount. In IBM's plan, OS/2 SNA gateways will implement the Network Node architecture and will look the same as a downstream AS/400. Each personal computer will continue to implement its own PU; apparently, IBM does not believe that the much larger memory requirement will pose a problem over the long term.

Extended Edition is a big gamble. If it becomes a standard, IBM will win big; if not, IBM will lose big. When the SNA gateway is simply a network node, the industry overall will benefit because the interface between the workstation and the gateway will be standardized: Today it is not. And operators will have a much clearer idea of the true topology of the networks they manage.

At this point, it's still uncertain whether IBM's long-term approach to SNA gateways will succeed. From a technical point of view, making the SNA local-area network gateway a network node is outstanding. But from a marketing point of view, selling it as a bundled product could be a serious mistake. Time will tell.

Forthcoming OS/2 support obsoletes current SNA gateways
Figure 2



The SNA gateway as we know it will be completely different within 18 to 24 months. The gateway personal computer will actually be an Advanced Peer-to-Peer Networking node.

GRAPHIC BY SUSAN SLATER SOURCE: JOSEPH MOHEN, SEACLIFF, N.Y.

(continued from page 55)
ed." The CCITT apparently recognized the need for PBX-to-exchange services and included provisions for invoking supplemental services in Q.932. "The Keypad and Feature Key specifications contain the codes that signal the [central office] as to the type of supplemental services requested," he explains.

For example, to camp on to a busy number, the user enters a specific code from the telephone or presses a function key that signals the central office.

"The service requests don't have to be invoked from a telephone handset; a personal computer could be programmed to send them," Hapeman continues. Hapeman emphasized that these procedures are not yet North American standards, but he predicts that they will be shortly.

Incompatibility

Given that PBX vendors are committed to CCITT and that the RBHC supplemental services are likely to be based on SS7, does that mean there will be massive incompatibility problems that will cripple hybrid networks? Some people who are quite familiar with TCAP and the CCITT don't see any significant problems.

> It's quite likely that heterogeneous nets won't support some supplemental services.
>
> ▲▲▲

"TCAP is very close to CCITT, but they're not compatible," states Bob Amy, manager of network standards development for IBM in Research Triangle Park, N.C., and vice-chairman of the T1S1 committee. "However, the Q.932 and Q.933 message formats are TCAP-based, so [PBX vendors] only have to change the [message's] content, which can be done in software."

It won't be especially difficult to move from a proprietary protocol to CCITT either, according to Ian Angus, president of the Angus TeleManagement Group, Inc. in Toronto. Angus says the PBX vendors' proprietary protocols won't saddle users with a huge upgrade problem if CCITT should be adopted as the international standard.

"The message length of the different vendors' protocols fits the size of Q.931 and Q.932 so just the contents will need to be changed, and that can be handled in software," Angus says.

Whose responsibility is it to convert the supplemental service requests issued by the PBX into a format that the exchange equipment can recognize when hybrid networks are being used — the PBX vendors or the carriers?

Nobody interviewed is certain. Some vendors believe that the RBHCs will do it, while others aren't sure the RBHCs will want to invest in the necessary equipment. Right now, SS7 isn't in every central office.

While the PBX vendors may be sincere in their pledge to conform to CCITT recommendations, the likelihood of a fully compatible international standard is about as remote as everyone agreeing to uniformly implement all levels of the OSI model.

It won't happen because PBX vendors have their own ideas as to which services are important, and they will continue offering unique services regardless of what the RBHCs or anyone else eventually implements. Therefore, it's quite likely that heterogeneous networks won't support some supplemental services.

That doesn't mean a standard can't be implemented that covers common supplemental services, yet leaves room for unique facilities. "The Q.932 and Q.933 have a facility called user-to-user messages that allows features that are not part of [Q.932 and Q.933] to be included," states AT&T's Frank Young. However, he emphasizes that only homogeneous PBXs running the same software will be able to enjoy them.

Even if the RBHCs are willing to go along with PBX vendors' supplemental services, Young says he doesn't think a fully compatible heterogeneous network is likely. "You'll always have someone adding something new, so the [network] will always be out of step." ◪

Letters

continued from page 35

messages could provide the code only to desired senders. Other users who wanted to receive all fax messages could disable the code requirement.

A handy by-product of this would be the capability to use a code for addressing fax messages to a final destination over local networks.

Technical solutions are often better than legislative ones. I suggest that Mr. Kopp and Mr. McCue consider participating in the technical standards process. Then it is more likely that solutions will be created — rather than a different set of problems.

Ken Krechmer
Principal
Action Consulting
Palo Alto, Calif.

NetView and NetQuest

Your report on the Codex Corp.-NetView link ("Codex forges a direct link to NetView," *NW,* May 15) inaccurately states, "Previously, NetView could directly manage only IBM's own 7860 and 586X series modems." In actual fact, true NetView-compatible products were announced over a year ago by NetQuest Corp., a small Mt. Laurel, N.J.-based manufacturer, and initial deliveries began last August.

NetQuest offers NetView V.32 dial-up/leased-line modems, data service unit/channel service units and limited-distance modems. These products will function with both Link Problem Determination Aid-1 (LPDA-1) and the more powerful LPDA-2, and they are deliverable today.

The Wydar Corp. distributes NetQuest products to local distributors nationwide.

George Dick
Technical liaison manager
The Wydar Corp.
Woodbury Heights, N.J.

System support

I would like to clarify a point made in the May 1 Local Networking section's "Worth Noting," which quotes me saying, "We [NCR] have no conflict supporting both NetWare and OS/2 LAN Manager."

To clarify, NCR currently sells its own version of OS/2 LAN Manager, while at the same time our personal computer systems are compatible with Novell, Inc.'s NetWare.

Thanks for your interest. We appreciate the opportunity to clarify these points.

Ron Stanczak
Assistant vice-president
Personal Computer Division
NCR Corp.
Dayton, Ohio

OSI net mgmt. specification released

CHICAGO — The Open Systems Interconnection/Network Management Forum said last week that it has published its Applications Services Specification, which will help developers build OSI-based net management applications supporting fault detection and configuration management.

The announcement was made at the Network Management Solutions '89 conference here — cosponsored by *Network World* and the OSI/Network Management Forum — and comes one week after the OSI/Network Management Forum's first annual meeting in London.

The OSI/Network Management Forum, a consortium of users and vendors working to define an OSI-based network management application development environment, also brought its membership ranks to 70 with the addition of seven new member companies, including General DataComm Industries, Inc., Tandem Computers, Inc. and France Telecom.

IBM and Digital Equipment Corp. remain two big holdouts.

Also last week, Mani Subramanian, vice-president of engineering for Digital Communications Associates, Inc.'s Network Communications Group, was named technical director of the OSI/Network Management Forum.

The Applications Services Specification is the second specification published by the group. The first, the Protocol Specification, published earlier this year, defines how developers can use OSI's Common Management Information Protocol (CMIP) to transmit data between management systems.

The Applications Services Specification defines a set of message formats that enable one vendor's net management system to pass such information as event reports, alarms and network device configuration data to an OSI-based management system using CMIP.

Used together, the two specifications will enable "most forum members to start writing experimental applications," said

> The technical committee expects to publish a list of object codes later this year.
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Ian Sugarbroad, vice-president of network technologies for Northern Telecom, Inc. Sugarbroad acts as a liaison between standards bodies and the OSI/Network Management Forum.

The OSI/Network Management Forum hopes several vendors will demonstrate interoperability between applications during Showcase 1990, an OSI/Network Management Forum event slated to be part of various trade shows next fall.

Subramanian said the technical committee will now begin work to define a standard for translating information about network components into a shortened code called an object.

By defining object codes, a proprietary management system will be able to send, for example, an alarm to an OSI-based net management system using a common code number. The OSI-based system will convert the code into words that can be displayed to the user.

The technical committee expects to publish a list of object codes later this year. Following publication of the object codes, the technical committee will begin developing specifications for performance management messages that let users measure such things as response times.

Other message formats to be developed over the next few years include accounting management, which provides information on who is using the net, and security management, which helps prevent unauthorized access to the network.

The OSI/Network Management Forum will also invite users to a series of roundtables next year that are designed to help the group determine what functions users want in OSI-based network management.

By drawing resources from all member companies, the OSI/Network Management Forum has been able to compile 60 man-years of research and development in the last 10 months, Subramanian said. "If one company were to undertake this effort, the amount of technical knowledge would probably not be available."

— Jim Brown

Carrier installs tracking system

continued from page 15

event of an accident or incident. This feature provides a nationwide emergency alert that is considered superior to the citizen's band radio used for emergency notification with escort vehicle service.

"If we have an emergency, we should be able to respond to it a lot faster than we could before," Azmoudeh said. "In any other case, somebody had to make a phone call to alert us of a possible problem. Now the driver, through the keyboard, has access to the entire system and can alert us to any type of emergency."

The system provides 64 different message formats the driver can use to notify Tri-State of different circumstances. There is also a free-form message to convey any pertinent information not covered by one of the forms. The messages are restricted to 1,900 characters.

In addition to the location messages prompted by the loran network, OmniTracs automatically updates the truck's location every hour. In isolated instances in which loran stations are out of range, Tri-State can send out a query from its operations center to determine the truck's location.

"Service is obviously a key to success in transportation these days. You have to be there on time and deliver on time," Azmoudeh said. "Through this system, we hope to take the guesswork out of our business."

FCC chided for price cap plan

continued from page 6

categories, or baskets, for pricing — fixed common line charges for switched services; traffic-sensitive charges for local switching and transport; and charges for all other services, including special access for private lines.

Carriers cannot raise or lower prices for services contained in the three baskets more than 5% without presenting extensive documentation to the FCC. Price increases for the baskets as a whole must be kept at 3% less than the rate of inflation.

Due to pressure from opponents who fear that price caps would give the local carriers too much pricing freedom, the FCC is proposing an "automatic stabilizer" that would adjust rates downward if the RBHCs' profits rise more than 2% above the current 12% rate of return.

But the ICA told the FCC that if price cap regulation is implemented for local carriers, customers will pay $1.6 billion more each year should the RBHCs be allowed to earn a 14% profit instead of the current 12%.

ICA also expressed concern that the ability to raise or lower service prices by 5% gives the RBHCs excessive flexibility to raise prices.

According to figures provided by Economics and Technology, Inc., a Boston-based research firm, even under the current system of regulation, the RBHCs have not tried to raise prices 5% each year.

The TCA told the FCC it has "significantly underestimated the threat to service quality posed by price cap regulation." Under price caps, the RBHCs can keep profits made as a result of lowering the cost of providing service. The TCA argued that the local carriers will cut back on network maintenance and investment in new technologies such as Signaling System 7.

The TCA said service quality problems might be particularly severe for private-line customers, "given the [local exchange carriers'] recognized desire to minimize usage of nonswitched services." The association also claimed that neither the FCC nor state regulators have the resources necessary to monitor service quality.

The RBHCs' ability to raise or lower prices within baskets by 5% may also be a problem for private-line users, the TCA said. "The [local exchange carriers] could engage in strategic pricing on a level heretofore unseen, jacking up high-capacity rates by 5% each year in an effort to tie users to far less efficient analog offerings."

The Ad Hoc Telecommunications Users Committee labeled the proposal unlawful and said the FCC's plan to set price caps based on existing rates — many of which the group said are too high and under investigation — ensures that price cap rates will be too high.

Additionally, the group said it is concerned that prices could be raised by more than 5% if a carrier presents justification.

Sales sag as negotiations lag

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because much more is at stake for IBM and Siemens than just the sale of a PBX operation. According to Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants in Needham, Mass., "The reason for this joint venture has more to do with Europe in 1992 than it does with the U.S. PBX market in 1989."

Springer believes the two companies are working out worldwide distribution agreements and research and development plans for a partnership that will be "much bigger than PBXs."

Sensing protectionist trade measures brewing in the U.S., Siemens wants to have IBM as its advocate in the U.S. Likewise, Springer said, IBM believes that as internal trade barriers go down in Europe in 1992, external barriers will go up. Because it generates one-third of its net profit from European sales, he said, "IBM wants a strong European ally to lobby on its behalf."

Protracted talks between IBM and Siemens do not signal a hitch in the Rolm agreement, Springer said. "I think IBM would give Rolm to Siemens to get a strong European partner."

Era of OSI net control nears

continued from page 1

for a particular vendor's products, said James Herman, a principal with Northeast Consulting Resources, Inc. in Boston.

Retaining existing management systems avoids the cost and work involved in revamping network devices to support OSI management protocols. "We're not going to see that many network devices with OSI protocols in them," Herman said.

However, users will need to retool existing net management systems to support OSI transport protocols, which will let them build a network of management systems that can be controlled from a single workstation.

"It's ironic," Herman said. "We have too many management systems, but we have to add one more."

Prototypes of the '90s

The prototypes expected out in 1990 will be developed using specifications drawn up by the OSI/Network Management Forum, a consortium of 70 vendor and user companies. OSI/Network Management Forum specifications are based on OSI draft standards and can be upgraded to comply with the final OSI standard.

In order to communicate with one another, proprietary and OSI-based systems need to support OSI's Common Management Information Protocol (CMIP), which is expected to be adopted in final form by 1990.

The OSI/Network Management Forum used a draft of CMIP, which defines the format for exchanging data between management systems, to develop its Protocol Specification, which was released earlier this year.

The International Standards Organization must still define a full set of messages that can be transmitted between systems using CMIP. These messages will include data on such network events as alarms and response time.

The OSI/Network Management Forum said last week it released its Applications Services Specification, which defines messages enabling a net management system to pass fault detection and configuration management information to an OSI-based management system.

Both ISO and the OSI/Network Management Forum are working to develop three other network management message formats.

The first, performance management, will enable users to measure such conditions as response times. The second, accounting management, will help users in billing for network usage.

Security management will help prevent unauthorized access to the network.

ISO and the OSI/Network Management Forum are also working to define a way to translate management information into a shortened code called an object.

Using an object code, a proprietary system will be able to send, for example, an alarm to an OSI-based net management system. The net management system will then convert the code into words that can be displayed to the user.

ISO expects to have a list of object codes by 1992 and a complete set of messages by 1993. The OSI/Network Management Forum will publish a list of object codes based on OSI drafts by year end and will adopt additional message sets as ISO defines them.

User dilemmas

Users agreed that an OSI-based net management system is the ultimate goal. But some are itching to begin migration to OSI now, while others are content to wait until the OSI standards dust settles.

Tom McGovern, systems officer for First Chicago Corp., said his bank has asked several vendors to lay out their integrated net control strategies and their plans to migrate to OSI. "We want to align ourselves with someone who can give us immediate benefits and position us to move into the future," McGovern said.

John Payne, staff telecommunications analyst with discount stock brokerage Charles Schwab Corp., said his company is currently revamping its entire network architecture and views network management as a key element in the plan.

But, he said, it is unlikely that Charles Schwab would entrust critical applications such as stock transaction processing to an untested management system.

"I'm willing to implement an OSI-based network architecture and wait for OSI network management," Payne said. Until OSI alternatives arrive, Payne plans to run critical applications on the existing network and manage them using IBM's NetView.

> "It's ironic. We have too many management systems, but we have to add one more," said Northeast Consulting Resources' Herman.
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Covia Corp., which runs United Air Lines, Inc.'s Apollo reservation system, couldn't wait for standards, so it developed a management system supporting links to vendor-specific control tools, said Mark Teflian during his keynote address at the conference. Teflian is vice-president of technical planning and systems engineering at Covia.

Covia's system supports links to tools that manage IBM and non-IBM equipment, transmission facilities and proprietary applications.

A major part of Covia's effort was getting senior management to understand that investments in net management had tangible benefits to the business.

Avoiding downtime on Apollo lets travel agents who subscribe to the network continue reserving airline seats, hotel rooms and rental cars.

For Samar Patel, telecommunications engineer for United Parcel Service, Inc., the need to add OSI support is becoming more important as the shipping giant expands its overseas operations. But UPS is also likely to wait a few years before jumping on the OSI management bandwagon.

"Right now, NetView is the solution for me," Patel said.

Users bemoan lack of automated tools

CHICAGO — Despite recent advances in net management technology, vendors still have far to go before they deliver the kind of automated network management capabilities users want.

So said several users at Network Management Solutions '89, sponsored here last week by *Network World* and the OSI/Network Management Forum.

Users at the show roundly criticized the automated operations capabilities of most existing network management tools, saying the products lack sufficient ability to sort through alarms and pinpoint troubles in network operations.

In addition, users complained that the products fail to effectively integrate disparate network management systems.

The result, users said, is that network management remains labor-intensive, a situation which can cause big problems in the current tight job market for skilled technical employees.

Getting more with less

"The biggest need with network management right now is getting better information with fewer people," said Clarence Brown Jr., data center manager with Latrobe, Pa.-based Kennametal, Inc.

One problem cited repeatedly by users was the inability of network management systems to intelligently sort through alarms.

"If a front-end processor goes down, a user will get a blur of alarms for each line served by that machine," said David Peterson, coordinator of network operations at Illinois Power Co. in Decatur, Ill. "What we need is a system smart enough to recognize that if the front-end processor alarm sounds, it should disregard the other alarms."

"The decision process [for dealing with network alarms] must be built into the network itself," added Mark Teflian, vice-president of technical planning and systems engineering at the airline reservation company Covia Corp. in Rosemont, Ill.

Peterson said existing network management products have some ability to automatically pinpoint and respond to network difficulties, but not enough. Peterson added that expert system technologies might improve the functionality of net management systems in this area, a contention with which several users agreed.

"These products need to be able to figure out that if a certain set of conditions occurs, then it should take the following intelligent actions," said David D'Urso, telecommunications analyst with the University of Illinois, in Champaign, Ill. "They may need expert systems to do this."

One interface

Coupled with the difficulties of alarm management are the problems users said they have with multiple incompatible network management systems.

"We can't have 20 different tubes in our network control center," said a network manager with a major consumer products company who requested anonymity. "Vendors have got to do a better job of tying together multivendor systems."

According to this network manager, multiple incompatible network management systems make the whole process of network management more labor-intensive.

"We have to train technical staff to specialize in their own little management system," she said. "This forces us to dedicate people to systems that really should be integrated with the entire operation."

— Barton Crockett

Groups lobby to keep RBHC restrictions

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — Representatives from major users groups last week urged Congress to maintain current RBHC business restrictions until adequate safeguards can be developed to protect consumers.

Testifying before the U.S. House Subcommittee on Telecommunications and Finance, officials from the Tele-Communications Association, Inc. (TCA) and the International Communications Association (ICA) told legislators that communications has become too important to U.S. corporations to risk major changes in policy.

The hearing was the fifth held this year by the subcommittee that was dedicated to examining the issues involved in crafting legislation to remove the current Consent Decree restrictions, which prevent the regional Bell holding companies from entering the information services and manufacturing markets.

The local carriers are also prohibited from providing long-distance service, but members of Congress have said there is little support for lifting that restriction.

Jerry Appleby, chairman of the board of TCA, told the subcommittee that the association fears that, without safeguards, the RBHCs would subsidize unregulated activities with money from their regulated operations and drive up the cost of regulated services.

Appleby said users are also concerned that service quality will deteriorate as the RBHCs devote resources to new businesses and forego or delay investments in new technologies for telephone service.

ICA Counsel Brian Moir said the group is concerned that the RBHCs could use their monopoly power over the local exchange to inhibit competition, thereby decreasing the choices available to users. The ICA urged Congress to postpone lifting Consent Decree restrictions until the local carriers either have viable competition or effective regulation.

"The FCC lacks adequate resources, both human and technical, and possibly the will, to adequately fulfill its existing statutory mandate," Moir said.

So unless new, more effective safeguards and adequate monitoring mechanisms can be put in place to protect business users, consumers would be at risk if the RBHCs are given more freedom, he said.

IBM offers peek at expert system

continued from page 1

answers in minutes rather than the hours or days it previously took network specialists."

Identifying bottlenecks

VRA differs from IBM's NetView network management system in the way it is used. Unlike NetView, VRA does not perform real-time, 24-hour-a-day network monitoring. Instead, VRA is used to isolate specific, hard-to-identify network problems on large, heavily trafficked System/370-based SNA networks, according to Fagg.

> The VRPM reduces the reams of data collected during a trace session so it can be managed by a personal computer.
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Basically, the system is used to examine data traces generated by IBM's mainframe operating systems. The traces show how data flows along logical circuits in SNA networks. By comparing this data to optimal data flows, VRA can identify traffic bottlenecks that cause network performance to degrade. Then, using a data base containing information about the customer's network and SNA networks in general, the system determines potential causes of the problem and makes recommendations to correct it.

VRA, for example, can help determine what is slowing down batch jobs and whether the network is being over- or underutilized, Waclawsky said.

The Virtual Route Analyzer consists of host-based software, called Virtual Route Performance Monitor (VRPM), and three software programs that run on a dedicated IBM Personal Computer: the Virtual Route Calculator, the Virtual Route Configuration Manager and the Virtual Route Analyzer, which is the actual expert system.

The VRPM host software runs on any IBM mainframe operating system and works with the trace data these systems generate. The software reduces the reams of data collected during a trace session so it can be managed by a personal computer.

Data parameter gauge

Once downloaded to the dedicated microcomputer, the Virtual Route Calculator software determines the actual and optimal data flow parameters for each circuit being evaluated. It then passes this information along to the VRA.

The Virtual Route Configuration Manager is a data base used to maintain data about the user's network configuration. The Configuration Manager passes information about the network along to the VRA. It is updated when the network manager alters the configuration or any of the parameters defining data flow along the network's physical or logical circuits.

Network traces typically examine about two hours of network traffic. This interval provides adequate amounts of data for the VRA to discern performance problems.

After the trace is completed, it takes about 10 minutes for the VRPM software on the host to ready the data and download it to the VRA-resident personal computer. The expert system then provides users with answers to their network problems as they key into it.

"We have been encouraged by VRA's effectiveness in solving some of our customers' network problems," Fagg said. "Its capability seems to increase with the size of the network."

AT&T submits more net deals

continued from page 2

a 1,000-mile call; and 13.5 cents for a 5,000-mile call. T-1 lines will cost $500 for installation plus monthly charges of $1,620 and $9 per mile.

Allied-Signal will also receive a 10% volume discount on charges between $30,000 and $50,000; a 12% discount on charges between $50,000 and $250,000; and a 16% discount on charges over $250,000.

Norian declined to discuss why Allied- Signal chose AT&T as a service provider, saying he wanted to wait until the tariff is approved.

The network deal for the unnamed customer, worth $60 million annually for five years, involves more than 14,000 voice ports and 2,054 data circuits, including 119 T-1 lines. The net will serve users in the U.S., Puerto Rico and the Virgin Islands.

Calls are priced according to seven mileage bands and three time periods — day, evening and night. Per-minute prices during business hours range from 5.5 cents for calls up to 292 miles to 11.7 cents for calls up to 5,750 miles. Per-line T-1 pricing will be $500 for installation plus monthly recurring charges of $1,150 and $7.50 per mile.

A volume pricing plan offers a discount on all charges exceeding $30,000 monthly.

A 5% discount applies to charges between $30,000 and $500,000; an 8% discount applies to charges between $500,000 and $3 million; and a 15% discount applies to charges over $3 million.

Supercomputer bill introduced

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Richard Liebhaber, executive vice-president of MCI Communications Corp., disagreed with Gabbard's approach. He said NSF should run the network because it does not have any ties to special interest groups and can foster interagency cooperation.

Gary Collins, senior vice-president for external affairs at Bell Atlantic Corp., suggested that while the government should fund research and development efforts, it should solicit bids from private industry to build the NREN and let ownership and operation of the network remain in the private sector.

To build the network at the lowest possible cost, bidding should be as competitive as possible. He argued that the regional Bell holding companies should be permitted to bid on the long-distance network, despite Consent Decree restrictions that prohibit them from providing long-distance services.

Collins also called for the decree's manufacturing restrictions to be eliminated — at least for this project — to enable the RBHCs to develop new technologies needed to make the national network possible.

While no one argued against the necessity of creating the NREN, some senators suggested that a larger share of the network's cost could be borne by the private sector.

John Rollwagen, chairman and chief executive officer of Cray Research, Inc., said private funding could never create the type of network outlined in Gore's bill because no single organization has the necessary resources. "Although private industry is prepared to do its part," he said, "we can't do it alone."

Gore told the committee that the government must act as a catalyst in establishing the national net. After it is completed, he said, the burden of support could be shifted to the private sector through a mechanism similar to the gasoline tax used to replenish the federal highway fund.

A similar version of the bill was introduced by Gore during the last congressional session.

Texaco opts for bridges

continued from page 1

— had to be tied to remote sites with other means.

"We had old statistical multiplexers for terminal traffic between the Briarpark [Texas] and Bellaire [Texas] facilities, but they were pretty restrictive," Lonvick said. "We could only put a limited number of terminals at one location and only a limited number of available ports at the other."

The IB/3 bridges enabled Lonvick to put terminal servers wherever they were needed, so workstations could be located more conveniently for users. The bridges also made it possible to monitor network traffic, break it down by protocol type and identify links that were being over- or underutilized.

Besides VAXes, the systems installed at the four sites range from personal computers and Sun Microsystems, Inc. workstations to IBM mainframes and a Cray Research, Inc. supercomputer. About 50% of the traffic on the internetwork is DECnet, a third is TCP/IP, and the rest is LAT traffic.

Bridging LAT

"LAT is a nonroutable protocol that has to be bridged," said Bob Roman, a product manager in 3Com's Enterprise Systems Division.

According to Roman, bridges like the IB/3 operate at the second, or data-link, level of the seven-layer Open Systems Interconnection model. Consequently, they ignore the protocol and look only at the Media Access Control header of a data packet to determine the address of the recipient.

This protocol independence makes bridges a better solution for multivendor environments than routers, Roman said.

Well-oiled network

Lonvick's division is in the exploration and production research end of Texaco's business.

The division uses personal computers tied together by token-ring networks to support office automation tasks. While EPTD is largely a VAX and Unix shop, IBM mainframes still handle a lot of the business applications.

Moreover, "MIS wanted the PCs on token-ring LANs," Lonvick said.

Initially, these local networks ran IBM's PC LAN Program, but EPTD wanted some additional functionality that IBM did not seem close to delivering. About a year ago, Lonvick and his group evaluated net operating systems from Novell, Inc., 3Com, Banyan Systems, Inc. and DEC. It finally settled on Banyan's VINES.

"We chose VINES because of its intercommunications capabilities," Lonvick said. "It was the only one with built-in support for the 56K-byte links we were using between the IB/3 bridges. Also, VINES offered a really comprehensive electronic-mail package, which we'd been lacking."

Today, there are a total of 16 VINES servers in the four facilities. At each remote site, one of the VINES servers is equipped with both a token ring and an Ethernet adapter, and acts as a gateway that the personal computers can use to communicate across the wide-area network.

Speed no problem

Today, the bridges are linked to one another by T-1 lines multiplexed into 256K-byte pipes, but two of the IB/3s are connected by a 56K-byte microwave channel. Although these data rates sound slow for local net-to-local net links, Lonvick said speed has not been a problem.

Within a given facility, Lonvick has installed primary bridges of various kinds to segment the Ethernet. Eighty percent of the day, each Ethernet segment is typically running at less than 10% of capacity, he said.

Vendors unveil X.400 API

continued from page 2

E-mail panel and manager of information exchange technologies for Hughes Aircraft Co.

McNeil Consumer Products Co., a Fort Washington, Pa.-based subsidiary of Johnson & Johnson, has already beta-tested a Retix gateway server employing the X.400 Gateway API standard.

The Retix gateway has dramatically improved the flow of communications between McNeil's E-mail systems, according to Vivian Beiswenger, MIS director for McNeil.

The AIA last week demonstrated how different firms can communicate over incompatible E-mail systems using the X.400 Gateway API. Eight aerospace firms, including McDonnell Douglas Corp., Hughes Aircraft and The Boeing Co., exchanged messages using different E-mail systems. The E-mail services demonstrated were AT&T Mail, Dialcom, Inc.'s Dialcom, GE Information Services' Quickcomm, IBM's Information Network Screen Mail, MCI Communications Corp.'s MCI Mail, Telenet's Telemail, Tymnet's OnTyme and Western Union Corp.'s Western Union 400.

Uses for the X.400 standard will eventually transcend E-mail, said James White, the primary author of the standard. White, a consultant with Rapport Communication, Inc., based in Palo Alto, Calif., said that X.400 could also be used to standardize communications for electronic data interchange and voice mail systems as well. The ultimate goal is global messaging, he said.

A gateway using the X.400 Gateway API standard should become commercially available toward the end of the year, said Telenet's Layne. After that, the final step for the user will be finding a way to determine E-mail addresses of people to whom they want to send messages.

And how will that be accomplished? "The words really choke in my throat," said Hughes Aircraft's York. "They'll have to call them on the phone."

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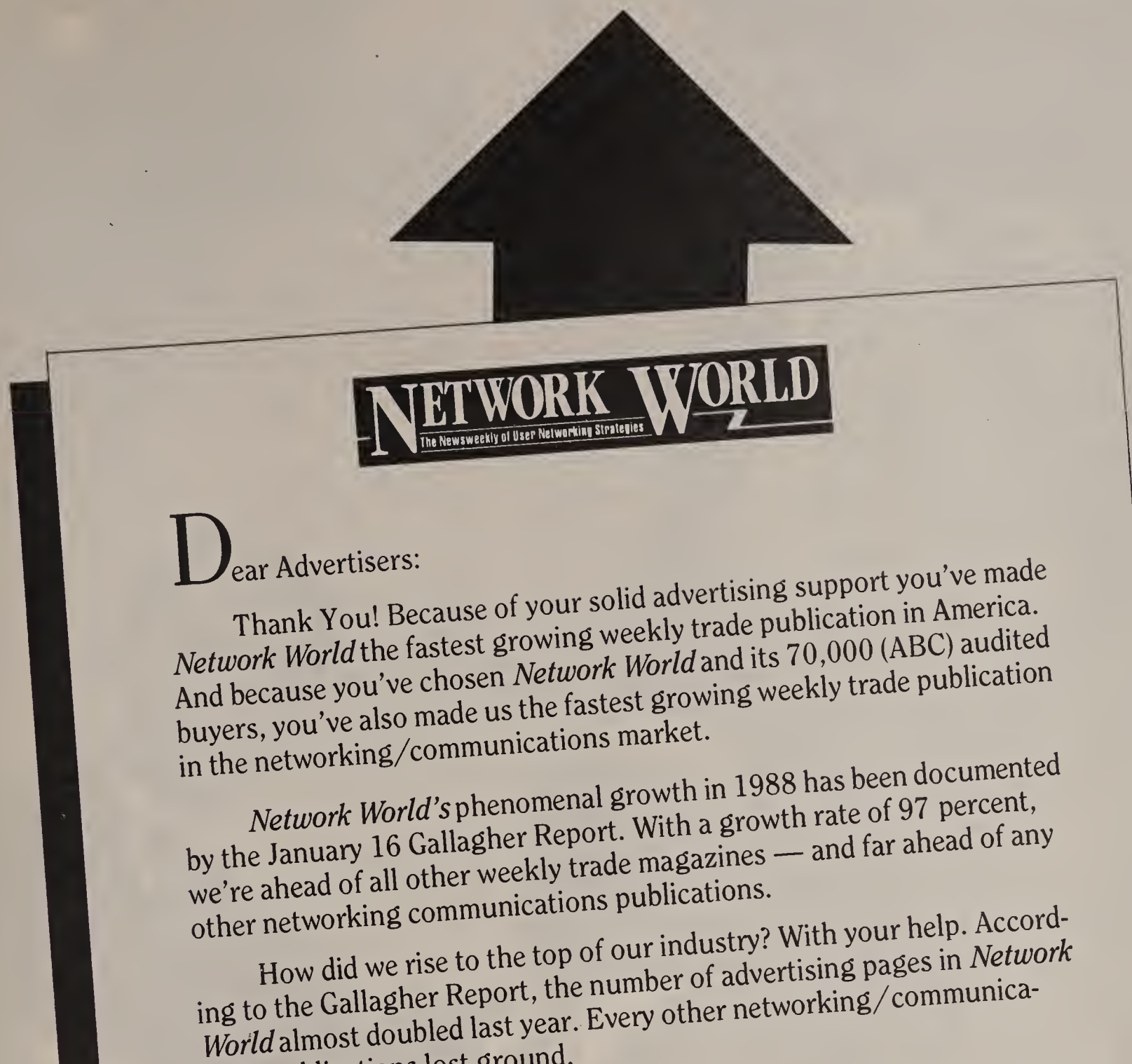

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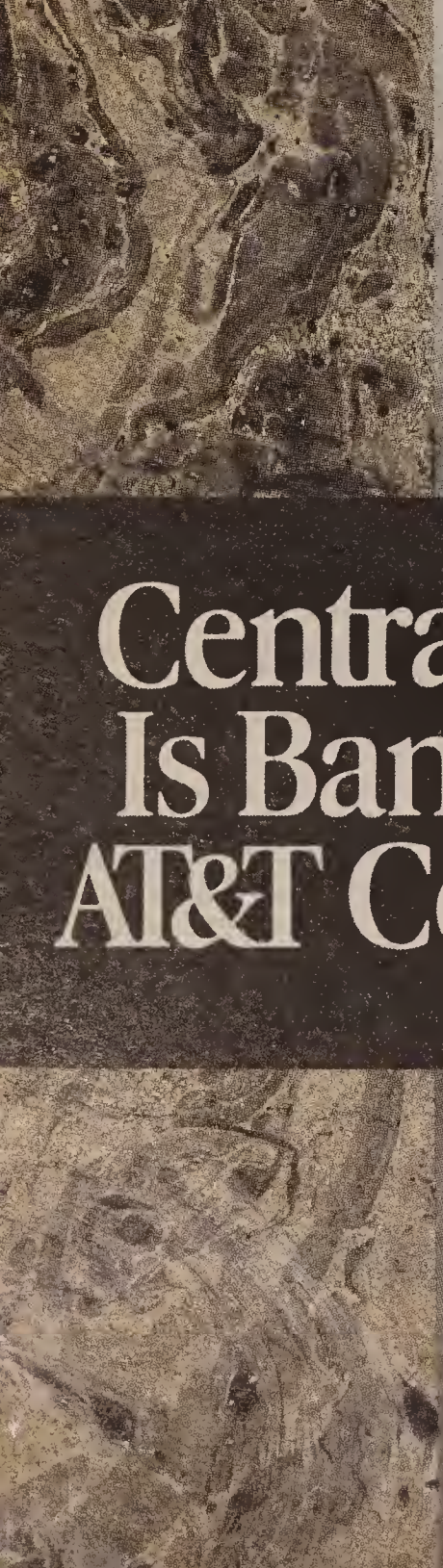

Left to Right:
Dean Dodrill
AT&T Area Technical Manager

Jay Livingston,
Corporate Executive Officer,
Central Fidelity Bank,
Richmond, Virginia

Richmond, Virginia
February 2, 1989

Central Fidelity Bank is among the nation's top 100 commercial banks with $4.8 billion in assets. Looking to extend its fourteen-year record earnings streak, the bank commissioned its data processing division to deliver a vital strategic initiative, improve productivity, enhance sales opportunities, and provide faster customer service in the bank's nearly two hundred branch offices. Jay Livingston met recently with Dean Dodrill of AT&T to review their work together.

Jay: Service is what bank customers expect. Faster service improves customer satisfaction and leads to more profitable relationships. When you speed up service, everyone is more productive, and we can spend more time with customers selling the bank's financial products.

Dean: Service and selling both depend on information. Our challenge was to provide the branches with rapid access to customer information and present that information to branch personnel in the most meaningful way. This could only be accomplished with a distributed, networked computing approach.

Jay: That's right. Our first priority was service and sales support in our branches, which meant fast, accurate retrieval and dispersal of information was crucial. AT&T's banking architecture provided that.

Dean: Early on, you talked about cost-effectiveness, return on investment, and a strategy for future growth and functionality. Remember that?

Jay: With an emphasis on profitability. We had major investments in existing systems and a lot of branches. AT&T's open systems approach didn't require trade-offs or expensive host additions, which is one of the reasons you got the business. AT&T's creative alternatives surprised us.

Dean: The ease of networking AT&T WGS computers was fundamental to our proposal. We delivered maximum functionality, flexibility, and reliability to every workstation in each branch.

Jay: And StarLAN was a terrific way to connect and share branch resources. You made the most of our assets, including the intangible ones.

Dean: Like your customer databases—we found ways to further develop relationships with existing customers. The applications development tools we built saved time for your developers. New products and services can now be added quickly to both platform and teller software, so service and sales can continually improve.

Jay: Every bank employee associated with this system has become more productive. In my twenty-three years of banking, I've never seen a vendor provide such high-quality service and support. Central Fidelity Bank and AT&T are well positioned for the future.

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Service firms top spenders

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The ICA represents over 660 member companies, each of which spends at least $1 million annually on telecommunications. Over 60% of the companies that responded to this year's survey said they spend more than $10 million annually.

How they rank

Companies in the service industries reported the highest expected increase in telecommunications expenditures this year, predicting they will spend nearly 14% more on telecommunications in 1989 than they did last year.

Government agencies were next in line, reporting an expected increase of more than 12% in their telecommunications budgets.

According to Merrill Blau, a communications specialist at Sears Technology Services, Inc. and chairman of the ICA's member services committee, which compiled the report, it is impossible to pin down the specific market factors that influence spending shifts because the members that respond to the survey may differ from year to year.

The average telecommunications budget increases of all ICA members have remained fairly constant over the past four years, never wavering by much more than 2% (see graphic on page 1).

While the steel and textile industries were the only ones expected to spend less on telecommunications this year than they did in 1988, other industrial companies — including tire and rubber, chemical and food-processing companies — reported that they expect their 1989 budgets to increase by less than the average 4.8%.

Looking at telecommunications expenditures as a percentage of operating expenses, banks and bank holding companies emerged as the biggest spenders in 1988. Although this group spent 2.68% of all operating expenses on telecommunications, this figure is actually down from 1987's high of 3.26% (see graphic, this page).

ICA members in utilities, manufacturing firms and university and nonprofit sectors showed the most dramatic increases in telecommunications spending as a percentage of operating expenses:

- Utilities almost tripled the amount they spent on telecommunications as a percentage of operating expenses last year, increasing their 1987 level from .32% to .92%.
- Manufacturing companies increased expenditures by 60%, while universities and nonprofit groups increased spending by 28%.
- However, transportation and trucking companies, as well as firms in the service industries, showed a drop in telecommunications spending — 8% and 4%, respectively — as a percentage of operating expenses.

On average, responding companies increased their telecommunications operating expense line item by slightly less than 1%.

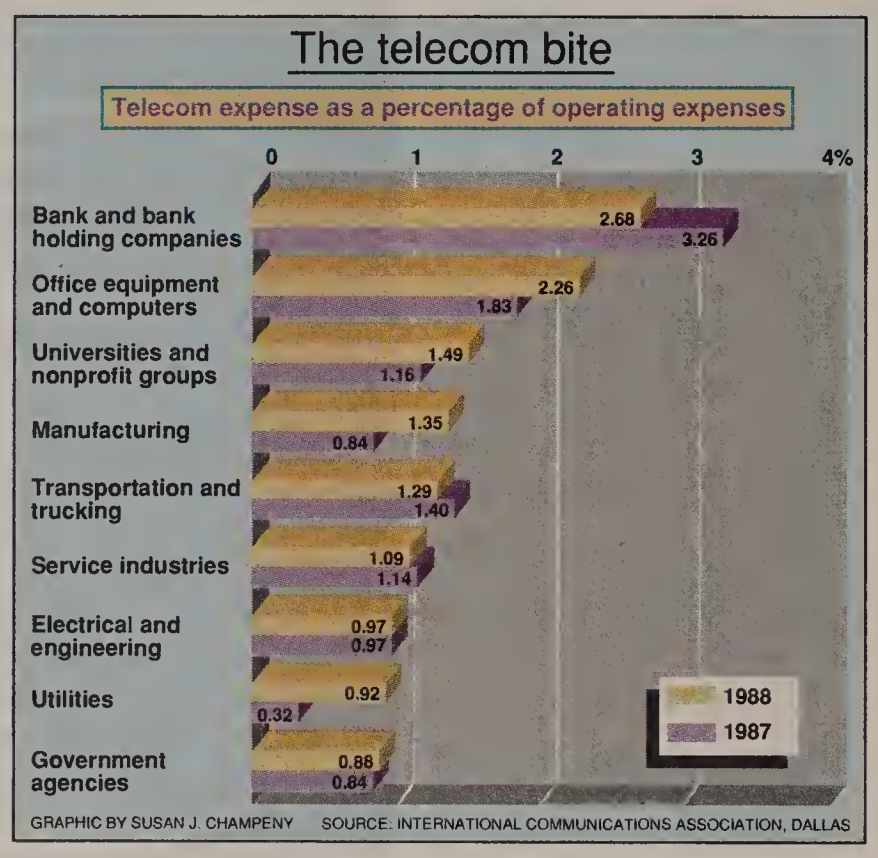
The sum total of 1988 operating expenses for the companies surveyed was $447 billion, while total 1988 telecommunications expenses were $4 billion.

In terms of telecommunications expenses as a percentage of revenue, office equipment and computer companies, universities and nonprofit organizations, and banks and bank holding companies spent the most on telecommunications, 1.83%, 1.65% and 1.48%, respectively.

The average percentage of revenue spent on telecommunications was .6%.

While some sectors reported large swings in the percentage of revenue spent on telecommunications — utilities more than tripled their 1987 levels while textile and apparel companies cut theirs almost in half — the average for the entire survey group has not varied more than two-tenths of a percentage point since 1984.

Approximately 25% of the ICA member companies responded to this year's survey.



Calendar

June 26-28, New York — Integrated Services Digital Network: ISDN. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030; (703) 591-3666.

June 26-28, Washington, D.C. — 7th Annual Telecommunications Conference. Contact: Gartner Group, Inc., 56 Top Gallant Road, P.O. Box 10212, Stamford, Conn. 06904-2212; (203) 964-0096.

June 27, New York — Getting Ready for the '90's: Voice Processing — How Will it Facilitate National/International Communications? Contact: Association for the Advancement of Communications Technology, SUNY Farmingdale, Administration Bldg., Room 208, Farmingdale, N.Y. 11735; (516) 269-6713.

June 28-30, New York — World Tech '89; Aerospace Technology: The Key to Global Markets. Contact: American European Trade & Exposition Center Corp., Suite 906, 225 West 34th St., New York, N.Y. 10122; (212) 563-5350.

July 5-7, San Francisco — Network Design. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030; (703) 591-3666.

July 6-7, Denver — Understanding Data Communications. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015; (201) 478-5400.

July 6-7, San Francisco — PC Networking. Contact: InfoLAN, P.O. Box 162323, Austin, Texas 78716; (800) 526-7469.

July 6-7, Atlanta — Introduction to LANS: Getting Your Feet Wet. Contact: InfoLAN (see above).

July 10-11, Boston — Troubleshooting & Maintaining the IBM PC, XT, AT, PS/2 & Compatibles. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015; (201) 478-5400.

July 11-12, Toronto — CASE: A Manager's Guide. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402; (213) 394-8305.

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Unforeseen problems that can put the bite on your operation

The problem with passwords

BY DALE MOIR

You're 12 years old, and you're playing in your tree house. Suddenly, there's a tug at the rope ladder — someone wants to come up. "What's the password?" you shout. "Catfish!" comes the reply, and your best friend appears at the hatch. Two minutes later, there's another tug at the ladder. This time it's your little sister. "What's the password?" you sneer. "Catfish!" she cries out, having overheard the previous user. Your heart sinks. This might have been your first encounter with the problems associated with passwords.

Passwords are the first line of defense against unauthorized access on most computer networks. For passwords to be an effective form of user authentication, some form of password management is required. The main considerations are that users select "good" passwords and that passwords are protected from compromise.

What makes a good password?

A good password is reasonably complex, yet it is easy to remember without being easy to guess. Password complexity can be defined as the extent to which a given password string uses the available key space, the set of legal characters that can be included in a password string. A reasonably complex password is likely to be difficult to guess. However, complexity also can make passwords difficult to remember.

One method of ensuring password complexity is password assignment. Aside from the problems of securely generating and distributing assigned passwords, the obvious shortfall is that users often find randomly generated passwords difficult to remember. If users resort to writing their passwords down or encoding them in their keyboard function keys, then a considerable risk of compromise is introduced.

The method of choice among system designers is to allow users to select their own passwords. This is simpler and much more diplomatic than password assignment. However, when password management is a distributed responsibility, complexity assurance mechanisms are much more difficult to implement. To ensure password complexity, some means of analyzing the user-selected strings must be provided.

A front-end complexity check can be added to the program that allows users to select a new password. When the new password is selected, a complexity check determines whether the selected string meets some predefined complexity criteria. If it does, the new password is accepted. If not, the user is prompted to "try again." The drawback to a front-end check lies in defining the complexity criteria. It is easy to determine whether a string is complex, but this will tell you little about whether or not the password is easy to guess. For example, employees of a major government agency, whose front-end complexity check required at least two nonalphabetic characters, began appending the last two digits of the year to their logon names to create what they thought would be simple, yet complex, passwords. In reality, this type of password is very easy to guess.

Back-end complexity checking can be a supplement or an alternative to front-end complexity checking. This amounts to running a password-cracking program in the hope of guessing your users' simple passwords before a hacker does. Back-end checking allows you to determine how effective your front-end complexity checker really is.

In addition to checking the complexity of users' passwords, give them some hints as to how they might create reasonably complex strings that can be easily remembered. One method is to select a simple word or phrase and then make it complex through some sort of character replacement scheme. This is accomplished by using digits for letters, like replacing an "i" with a "1," an "o" with a "0," an "s" with a "5" and so on. If the example above is used as a guide, ordinary English words can turn into a pseudo-clever password. For example, using character replacement, the word "password" would be transformed into "pa55w0rd." This method allows users to broaden the range of characters that appear in their passwords. However, since this scheme is well-known, hackers may incorporate these variations into a guessing algorithm. A simple twist, known as a "shift," can add complexity to passwords. Shifting means that the replacement character is "shifted" on the keyboard some number of characters to the left or the right. The shift can be applied in either direction and in varying levels of magnitude.

It's a crazy, mixed-up word

Complex strings that are easy to remember can be derived from many sources. You might select the first eight characters that appear in the first eight words of a favorite phrase — as long as you avoid famous or well-known phrases. You can make up a sentence that describes your surroundings, such as "no one here is a wizard like me," and then use those first letters.

Sentence schemes, digit replacements, plain old imagination — there are hundreds of ways to make good passwords. Still, they don't do you a bit of good unless all users are aware of their responsibility and take password selection seriously.

In a distributed environment, every user is a link in the security chain. One user, using his or her logon name (or logon name backwards) as a password defeats the efforts of every other user. By using the techniques described above and by also including some type of complexity checking, a reasonable level of password integrity can be assured.

Password protection

Any time you type your password at the keyboard, you incur some level of risk. First of all, how do you know that the program reading your password is really the logon program? It might be a trojan horse *masquerading* as the logon program. A simple safeguard is to always type an incorrect password at the first logon prompt, as this will thwart an unsophisticated trojan horse.

Note that when your password is processed by the logon program, it must be stored in memory. If any user can read any area of memory, then your password is vulnerable for this brief period of time. The *stored* copy of your password is also at risk of exposure. This is true even if passwords are stored in encrypted format. An encrypted password, along with the encryption program, provides the basis for a guessing attack on the password space. The file in which passwords are stored should always be carefully protected.

In general, every component of the password mechanism should be protected with file permissions and any other safeguards. Access to these facilities by remote hosts should be as limited as possible. Any information about users or their passwords must be considered sensitive.

Moir is product manager for Lachman Associates, Inc., a systems consulting and software company in Naperville, Ill.

IT'S HARD TO DRAIN THE SWAMP when those reptiles keep getting in the way. If you have a network "alligator story" to share with *Network World* readers, call Steve Moore, features editor, at (508) 820-2543, ext. 732, or fax your idea to (508) 879-3167.

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